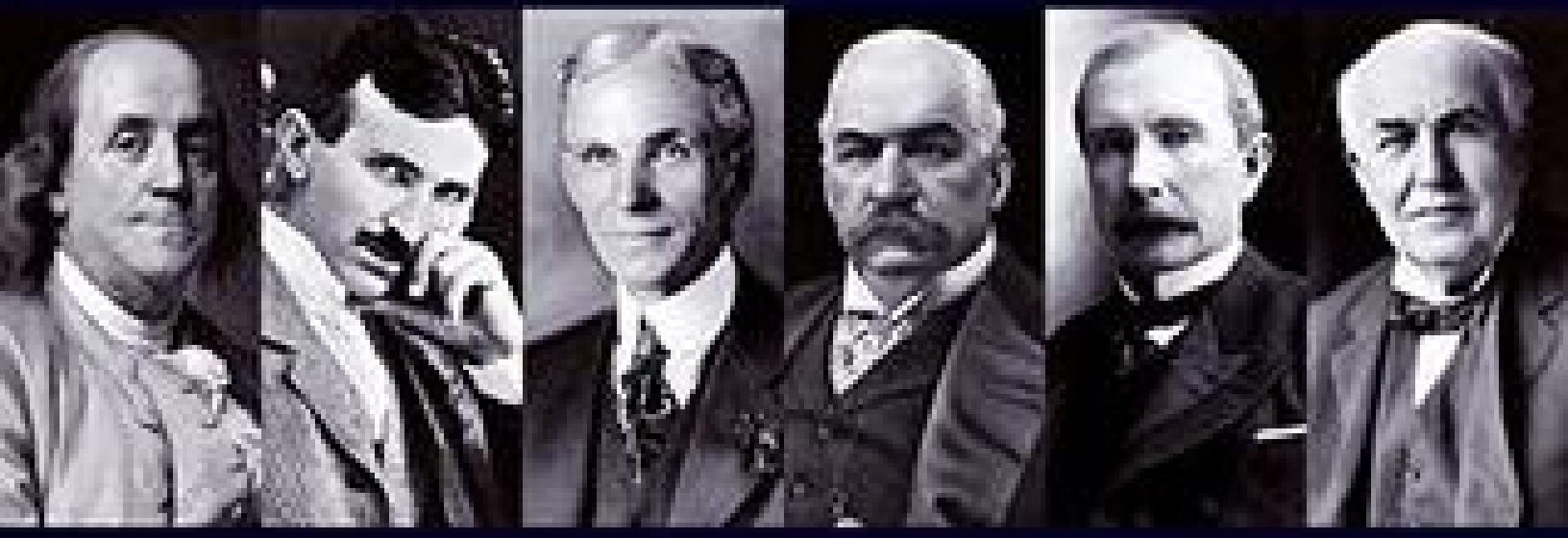
# THE BIOGRAPHY COLLECTION

*Benjamin Franklin, Nikola Tesla, Henry Ford, J.P. Morgan, John D. Rockefeller, and Thomas Edison*



STEVEN BOWEN

# The Biography Collection: Benjamin Franklin, Nikola Tesla, Henry Ford, J.P. Morgan, John D. Rockefeller, and Thomas Edison

By: Steven Bowen

## Benjamin Franklin: A Biography

### Preface

Ben Franklin is one of the most iconic Americans etched into the annals of history. Despite his burliness, he was considered quite the ladies' man during his later years. He served as ambassador for France—considered the only man for the job. His practical wisdom and industriousness has made him arguably one of the most studied, praised, and emulated people since he first published his autobiography in 1789. Some consider him one of America's first self-help experts. Many think of him as one of the best inventers and scientists of his generation, also considering that he did not have any formal scientific training—his education was mostly pragmatic (what we would to this day consider a trade-school type education) and led to a very do-it-yourself mentality in the man. In addition, the nature of his

education definitely lessened the boundaries between the eclectic ranges of disciplines he would venture into throughout his lifetime.

Because he didn't have a formal education—sadly, the result of these are often restricting and stuffy for those who stick to a discipline for many years—he never really let self-doubt or discouragement bore its way through his brain. His father encouraged reading from a young age, on a wide range of subjects, and because of the industrious nature of his family ancestry, he was encouraged to find the trade that best suited his gifts and abilities. Instead of becoming a tallow chandler (candle craftsman) he would find his way as a printmaker. Then after garnering enough support, an impressive reputation, and work ethic, he would rise through the ranks to see an exponential amount of success in his lifetime. This reputation and success would further help drive the sales of his books and help him find funding for his entrepreneurial projects. His inventions, his political wisdom and advice, the friendships he gained, and the charm he gave off, made him become one of the most popular people at the time; and his influence was far-reaching, and is still going strong. We will learn the details of why this man had such a strong presence during the time of revolution in America, as well as why he still commands as large an audience as ever.

## (Part 1)

## Ben Franklin's Family: The Influence His Father, Uncles, and Brothers had on him

To first understand the personality and industriousness of Benjamin Franklin, we have to learn about the family that played a big part in making the man what he was. In his Autobiography, Ben Franklin writes it to his son William Franklin. The first part of the autobiography begins with an account of his grandfather, his father, uncles, and briefly, his mother. He does this for humility's sake; although, biographer Walter Isaacson feels that Ben Franklin is committing the sin of offering up a humble brag for

most of autobiography; thus any deflection of his own merit and accomplishments is a rather poor attempt at humility for Franklin. Isaacson also provides some biographical details on the Franklin family, saying that their name originated during the late Middle Ages: “A new class emerged in the villages of rural England: men who possessed property and wealth but were not members of the titled aristocracy…these freeholders came to be known as franklins, from the Middle English word ‘frankeleyn,’ meaning freeman.” Perhaps it is his lineage which ultimately led to the formation of his proud personality—his outsider disposition coupled with his dislike of authority. The Franklins, being freemen, outside of the aristocracy, would carry with their blood the pride of the Franklin name, and this would pass on from generation to generation onto Franklin. Despite the humble brags and the legacy behind his name, Benjamin offers up a brief history of the Franklin family as means for explaining the reason why he was so successful; also he might have just wanted to find an excuse to celebrate their legacy. He starts by listing the professions of his uncles: “Thomas was bred a smith under his father…John was bred a dyer, I believe of woolens, Benjamin was bred a silk dyer, serving an apprenticeship at London. He was an ingenious man…” and so on and so forth until he arrived on the subject of his father Josiah.

Josiah, the patriarch of Ben’s family, is said to have had seventeen children according to Franklin. He was a businessman, tallow-chandler, and tithing man for his church. His influence over Benjamin gave him the direction he needed to start his apprenticeship at the age of twelve. At first, though, Josiah wanted Ben to become a preacher because young Benjamin had a strong penchant for reading. With the help from his uncle Ben (whom he was named after), he rose from being a middling student to quickly becoming the head of his class. He was then taken out of grammar school because of the financial state of the Franklin household (there were surely a lot of mouths to feed) and instead placed in a school for “arithmetic and writing.” He would fail arithmetic and would have to withdraw from school to help his father with his candle making trade, but he would quickly head down the path that would make him into the man we so closely associate with Benjamin Josiah Franklin. First, his father Josiah is almost the spitting image of what Ben would come to embody, only more so.

Franklin gives some physical descriptions of Josiah as such: “He had an excellent constitution of body, was of middle stature, but well set, and very strong; he was ingenious, could draw prettily, was skilled a little in music, and had a clear, pleasing voice.” Physically, the mature Ben Franklin would also share similar physical characteristics with Josiah, but even more so in the regard that he too was a “mechanical genius, and on occasion was very handy…” Even more so when he states that his greatest asset was his “understanding and solid judgement in prudential matters, both in private and publick [sic] affairs.” He would also share the same characteristic of being consulted by many people who sought his advice on a variety of affairs. His father would be one of the biggest influences on his life character, personality, and overall future. Josiah would recognize the potential he saw in his son for reading, and he would open up the door for his career in printing. As he states, “My father was under apprehensions that if he did not find one for me more agreeable, I should break away and get to sea, as his son Josiah (Jr.) had done, to his great vexation.” Not wanting to have another son with a sea-laden career, Josiah (Sr.) was desperate to break that dangerous streak, and instead made it apparent that Ben Franklin would become a cutler with his cousin Samuel, but was offended to find out that he wanted to charge a fee to take Benjamin on board as apprentice. Back to the drawing board it was, until he decided that it was ok to have two sons with the same profession: Benjamin the bookworm would become a printer just like his brother James.

At the age of twelve, Franklin was to be an apprentice to his brother James until he was the ripe age of twenty-one years old. The experience would forever establish an identity in Franklin’s mind as being a printer over everything else he was called during his lifetime: diplomat, ambassador, inventor, politician, scholar, and author. It was also a very important profession from which Ben developed the intellectual side of his personality. Because of an “acquaintance with the apprentices of booksellers,” Franklin was allowed the invaluable opportunities of borrowing books from these sellers after business hours and finishing them before they opened for business the next day. It was a very short-term library system that he started in this respect. He was eventually loaned books from an associate named Matthew Adams. Through this practice, his

writing developed, his thinking was clearer, and he was able to work on mastering the art of rhetoric to further his reputation. Without the printing trade he would have surely never developed in such a positive light. He had his father Josiah and his brother James to thank for spearheading the processes that would broaden his horizons—even if James would be a pretty harsh master to Ben during his apprenticeship to his older brother.

## Benjamin's Start in the Printing Industry and the Inception of Poor Richard's Almanac

Ben's older brother James was a tough boss to have. Like most sibling relationships, rivalries and ill feelings are often the inevitable result of sharing the same DNA. The dynamic between the elder and younger brothers was complicated and for the most part, stressful and tiresome for Ben, but it did have its perks. As a result of this apprenticeship, Franklin was given a platform from which he could launch his first foray into serious writing. Because James Franklin was the owner of what Franklin called the second newspaper that appeared in America, "the only one before it was the Boston News Letter." James's newspaper was named the New England Courant. Having established himself as the distinguished owner of the second newspaper in American existence, he put Franklin to work, making him run through the streets with an armful of papers for paying customers. Opportunity would arise for Franklin sooner rather than later as he made the decision to offering up his own writing to the Courant.

As James and his friends contributed their writings to the Courant, Ben would find it important to add his own to the mix. He penned some writings, keeping his identity anonymous, and disguising his penmanship because he was afraid his brother would know they were his writings. He has this to say about the episode: "but being still a boy, and suspecting that my brother would object to printing anything of mine in his paper if he knew it to be mine, I contrived to disguise my hand…" The next morning, having done the deed, the writing was sent to its proper place, and the readership responded. Franklin felt a gush of pride when he heard the critical response to his written musings: "I had the exquisite pleasure of

finding it met with their approbation, and that, in their different guesses at the author, none were named but men of some character…"

This went on for some time until suspicions were cast and his older brother grew annoyed with him. Eventually, James would be arrested and jailed for publishing a piece without discretion that "gave offense to the Assembly." Franklin would taste independence as he ran the newspaper under his own name "to avoid the censure of the Assembly." Eventually, Franklin would aspire to leave the publishing house and James would bar the decision, leading to a tense time where every publishing house in Boston would turn the young Franklin away if he even tried. So, knowing well that he had to break off on his own at this point, Franklin called on the help of a friend (Collins). Collins would help Franklin become a stowaway on board a ship headed for New York. He was seventeen at the time and really had no connections or plan for survival other than his own ambitions and vivacious personality. He would not stay very long in New York, later being sent to Philadelphia by the recommendation of William Bradford in order to find employment. Once he made it there, poor, in need of food, a pitiful and awkward sight, he eventually found employment and lodging.

After spent some crucial time abroad and within the printing industry, Franklin would eventually publish his best-selling Poor Richard's Almanac in 1732. He used the pen name Richard Saunders to keep his identity anonymous. These are his words on the project: "I endeavored to make it both entertaining and useful, and it accordingly came to be in such demand, that I reap'd considerable profit from it, vending annually near ten thousand." This was a very productive enterprise for Franklin as his almanacs made him a self-help guru of sorts. The almanac was chock full of "proverbial sentences," and other tidbits of wisdom meant to teach the common person how to procure wealth and live productive lives. Through the merit of his writings, Franklin proved the power of the pamphlet at stirring the public. His was a case study in the nature of what the public demanded to read. He knew that they read very little else than the subject matter and advice that Poor Richard offered them and he catered to that sentiment—he also added some depth to the dialogue he was striking up with the public, bringing some of his bookishness into the mix for their

benefit. Moving on from the printing world, much needs to be said about his inventions.

## (Interlude)

## The Inventive Side of Ben Franklin

It is well known that Ben Franklin had an inventive streak during his lifetime. It can even be said that with this inventive side of his personality, in addition to his reading habits, and practical abilities, he can be described as a renaissance man of sorts—like a burly, founding father version of Leonard Da Vinci. Some of these inventions are prototypes of gadgets and devices in use today in some form or another. Although it was not that long ago that Benjamin Franklin walked about Philadelphia, it is still very fascinating to look at some of the ingenious things he invented. Some of these inventions range from swimming fins—Ben was known to be a good swimmer when he was younger—to The Franklin Stove and bifocals. In addition to those, he also invented a novel usage for the odometer.

Sticking with the odometer for now, during the 1760's he was approached by the Brits to investigate and better the colonial post office. Because the state of parcel system was in such dire straits, the pragmatic Franklin was expected to find the solution. His response was pretty clever. He found himself traveling to the major postal hubs in the colonies, and "along the way, Franklin charted the distances between postal stations by attaching a geared device to the rear wheel of his horse carriage. Every 400 revolutions made by his carriage wheel would cause the device to click ahead one mile (1.6 kilometers). By the end of Franklin's tour, he had gathered a stunningly accurate survey of early colonial roads." Now, many have pointed out that this was not the inception of the odometer at all, but was just a very nuanced way of using the technology. Now, when taking this brief tour, we have to spend some time talking about two of his most popular inventions: The Franklin Stove and the lightning rod.

With the lightning rod, Franklin would spend most of his time after retirement concocting various science experiments. To some, it might have

seemed like Franklin had suffered a recent nervous breakdown or something similar. His labors eventually did bear fruit: “After countless hours spent tinkering with static electricity, Franklin figured that if a metal rod could be fixed to the top of a building and wired to the ground with a cable, it could gently extract the ‘fire’ from a cloud before it had a chance to do any damage.” This would save many churches and buildings from suffering a fiery fate so common when lightning struck. Instead of hoping for the best, Franklin served a very practical purpose with this invention.

Now, briefly, this episode is enshrouded in myth and legend. We are taught that Ben was flying a kite with a key attached to it when he had the eureka moment about the correlation between electricity and lightning—and then supposedly he invented his lightning rod; but just like Isaac Newton and the apple that taught him gravity, the actuality of the whole incident is pretty apocryphal. A logical reason for the propagation of the myth is that it makes its pretty interesting for school kids to learn about when very memorable tales are told. Much like most history taught in grade school, the actual truth of the matter is a little more complicated. However, same principle applies: Ben Franklin was interested in electricity, he did some experiments, and he invented the lightning rod. Moving onto The Franklin Stove, Franklin continued his streak of improving the safety of Colonial American technology with this invention.

When it came to fireplaces, many families played a very dangerous game every time they lit a fire. Because of this, Franklin sought first to make the process safer, but also more efficient. As this excerpt from a Britannica article on heating states: “Stoves are far less wasteful of heat than fireplaces because the heat of the fire is absorbed by the stove walls, which heat the air in the room, rather than passing up the chimney in the form of hot combustion gases.” Franklin continued to serve his country, and the Franklin Stove heated the homes of Americans for a couple of centuries afterwards. This and many other lesser inventions would benefit the country. In conjunction with his self-help advice and writings, he would contribute technologically, and lastly, politically, becoming one of the Founding Fathers.

(Part 2)

## Franklin's Role as a Founding Father

Without a doubt, as far as American history goes, Franklin's role in helping bolster the plans that would free Americans from British rule is often considered to be the most important facet of Franklin's life. Although he did not have as hands-on a role as Jefferson or Adams in the actual drafting of the documents, his presence and counsel and overall diplomatic help was invaluable. In addition, as PBS relates: "Franklin has the unique distinction of having signed all three of the major documents that freed the colonies from British rule and established the United States as an independent nation: the Declaration of Independence, The Treaty of Paris, and the United States Constitution." In addition, he did have a role in editing Thomas Jefferson's document, but only a very minimal one (in reality, he changed three words). Things did not start out so smoothly for Franklin, as Walter Isaacson relays to readers in his biography on the man. According to Isaacson, directly after Benjamin Franklin was elected a delegate of the Continental Congress, his colleagues were initially suspicious of the seventy-year-old Franklin because he hardly said a word during meetings. He was usually asleep while words were being said, and he had just come back from a decade in England, so his being a spy for the King of England was not that farfetched to assume. All of this was, of course, silly in hindsight, but at first, Franklin definitely did not do himself any favors by acting that way during such a tense time in American history. Isaacson tells us that he was actually directing all of his energy in an attempt to bring some companions under the auspices of the American Revolution—to abandon the Brits and their despotic kingdom for the republic that the founding fathers were attempting to create. The most important of those he was trying to convince was actually his son William Franklin.

What led Franklin to form his strong views for independence? Having spent so much time in Britain, he could have easily taken a more neutral stance, like his son William, who was actually the governor of New Jersey; but Franklin decided this was a bad idea. In fact, the whole point of leaving England and coming to America was to escape the suffocating nature of

having a king reside over your every action. It also irked Franklin that leadership would be derived from blood relations over merit. To Poor Richard—the self-made man of industry, science, and elbow grease—merit and character were all you had by which to correctly judge an individual. This is why he could not agree with his son; the idea of taking a neutral stance toward revolution was just as bad as opposing it. To draw from Isaacson's biography again, "Franklin chafed at authority, which is why he had run away from his brother's print shop in Boston. He was not awed by established elites, whether they be the Mathers or the Penns or the Peers in the House of Lords. He was cheeky in his writings and rebellious in his manner." Because Franklin had exemplified the complete opposite in the way he conducted his business and lived his life, he could not, in good conscience, stay neutral. Much to the chagrin of his son (and, of course, Franklin as well) they would stay in disagreement on the issue. Having thus sowed the seeds of discontent with the Redcoat rule, Franklin would from his old age until death, maintain an aggressive stance against any British rule.

It definitely made it easier for him to do so after the Battle of Bunker Hill and the burning that happened at Charleston earlier in 1775. He then started making it apparent just how much he loathed the British. Any that were before skeptical about where his allegiances lay had then become reassured that he was wholeheartedly on their side. When he proposed his thirteen articles of confederation to Congress, it "contained the seeds of the great conceptual breakthrough that would eventually define America's federal system." That's how integral Franklin's thinking was in this aspect of shaping the country we know today, including the original colonies all banding together to fight and defend the country. Franklin also highlighted the importance of keeping a division of powers in place to avoid tyranny or a despotic leader from once again ensnaring the nation. There would be a separation of power at a federal and state level. Although the original articles would, of course, be cut down via congress and edited on a committee basis, the original idea and philosophy was still very much Franklin-breathed. Having someone on board with his writing prowess and experience surely made the documents he was involved with all the more

powerfully constructed. In fact, Benjamin Franklin is said to have made one of the most famous changes to the Declaration of Independence.

Although the document was mostly drawn up by Thomas Jefferson, Benjamin Franklin would make it a lot stronger in the best possible way. He cut out some extraneous words near the beginning, arguably the most famous of them all. The first draft read like this, "We hold these truths to be sacred and undeniable." Once Franklin had reworked it with his keen editor's eye, it would later morph into the more succinct, ""We hold these truths to be self-evident." Of course, it was not just Thomas Jefferson who did all the work on the document. He was given chief responsibility for drafting the bill, but he worked with a team of five men: "A member of a five-man committee that also included John Adams and Benjamin Franklin, Jefferson drew up a draft and included Franklin's and Adams' corrections. At the time, the Declaration of Independence was regarded as a collective effort of the Continental Congress." It would take a few years for it to be more known that Jefferson had drafted the majority of the bill himself, but the sentiment and underlying concepts were shared by all of the men. This, and then the Constitution, would also become welcome additions to the résumé of Ben Franklin.

There is an interesting article in Mental Floss that recounts the day the Constitution was signed. Apparently, Franklin was not in total agreement with all that was being said in the document, but you cannot please everyone, and Franklin was happy enough with it. He actually went on to say that it was astonishingly close to perfection, despite the collective of men present, which he pointed out would mean the absorption of multiple worldviews and philosophies all into one document. Nevertheless, everything was impressively constructed—a common ground was met between all people and the result was beautiful to Franklin. That is the great thing about what America stood for: everyone was given equal voice, and a commonality was taken from the seemingly chaotic bin of ideas that each man brought to the table. The most relevant to the cause were chosen and independence was the result. The Constitution was also signed by Franklin, but at this point, he was pretty far along in age and had a minimal role in the actual process.

# Ambassador Ben Franklin

So being a founding father is an impressive feat—laying the groundwork for the future America and providing much needed morale and energy to the continental congress. Logistically, without Franklin as the ambassador to France during the war, things may have been completely different for the Americans. PBS once again provides key information on Franklin and this episode of his life: “There is no doubt that America would not have won the Revolutionary War without France's financial and military aid and that Franklin was almost entirely responsible for obtaining that aid.” This is a pretty bold statement to make. What exactly did Franklin do though, and why was he so good at being the ambassador, especially at his old age?

First of all, France was considered to be one the major superpowers in Europe. England was as well, and, because they were off the table, the Americans went for a logical alliance. If not for bad blood between France and England, though, the alliance would have probably petered out before it began. “France was humiliated after its defeat in the French and Indian Wars, and England was their enemy. It was in France's self-interest to help the Americans; it was a way of getting back at the British.” Thus, some of the work had already been done for Ben Franklin. Like all aspects of war, things are often quite complicated. It takes quite the personality and oratory skill to convince a foreign power that it would be in their best interest to join forces and fight another superpower. It was an easy decision by those in charge to make. In the end, “he was the first official diplomat and ambassador to the thirteen colonies. His presence in Paris annoyed the British government. Between 1778 and 1782 France kept providing the Continental Army with arms, ammunition, troops, uniforms and naval support.” In short, this was a nightmare for the British. Because of the relationship and the time Franklin spent overseas in France, they harbored very fond memories of the man, even long after he died.

This was, in part, because he was such a fun man to go partying with. Imagine that. A lot of the success that Franklin had as an ambassador in France was because he knew how to party. In fact, when John Adams came over to visit the charming Franklin, he “failed to grasp the purpose of these

parties, that French society combined politics with pleasure in a way that he was not accustomed." Not used to this French dynamic, Adams thought that Franklin was getting away with wasting his time in hedonism on a scale that would have made a Puritan faint. It was a part of Franklin's genius to be flexible and welcoming of the different dynamics. He fit in swimmingly with the French, learning the language well, and adopting enough of the culture to convey considerable respect. He was loved in France the way Gilbert du Motier, Marquis de Lafayette was loved in America. Like Lafayette, Franklin would help the war cause immensely.

## Ben Franklin's Legacy

Sadly, by the time that America was getting new life and breaking off from the British, was the same time that Franklin's health really started deteriorating. He would still have almost a decade left to go, but his lungs would become infected (pleurisy). Having suffered intermittently from the ailment since he was a young man, the older body of Franklin was not as resilient and found it harder to fight off. By the time he had come back from France, he was close to death. His legacy lives on every time a student first learns about the mythos surrounding the man: the true stories and the most likely fabricated accounts of his experiments. The inflated stories of his penniless days and the humble brags from a man who perhaps deserved to be a little ostentatious in word. Reportedly, he won over the hearts of the French enough for them to assume he was president. Even many people in the United States sometimes forget that the man on the hundred dollar bill was never actually a president.

In brief, the man made an impressive display of simple hard work and determination. His practicality, words of wisdom, and inventions showed the neural blueprints of an impressive mind, but overall, he was just a man who liked to joke, laugh, write, read, and work hard. There surely have only been a select few like him since he passed. Ben Franklin embodied the eclectic nature of a renaissance man who was all for the rebirth of our nation, and without his influence, America may have been a very different place. Who's to say? We can only speculate. One thing is for sure—he

exemplified the principles of the hardworking, industrious citizen who makes their own destiny. Sometimes we need to be reminded of the value of a life well lived. Ben Franklin certainly provides that for us.

# Nikola Tesla: A Biography

Nikola Tesla was one of the most prolific inventors and scientists in modern history. His experiments involving electricity, alternating currents, and physics led to innovations such as household electricity and wireless technology. He invented a wireless controlled boat and theorized that his inventions could allow wireless communications.

## Early Life

Nikola Tesla was born on July 10, 1856 in what is now known as Croatia. He was born an ethnic Serb in the Austrian Empire. His father, Multin Tesla, was a well-regarded and successful clergyman and served as a Greek

Orthodox priest. Tesla's father previously attended officer's training school but rejected joining the army and instead transitioned to the ministry.

His mother, Duka Tesla, was a housewife with a near photographic memory who regularly invented household tools and appliances. His mother was known to memorize entire Serbian ethnic poems, and Tesla attributed his memory, creativity, and inventive skills to his mother. Although his mother was illiterate and never obtained a formal education, she exhibited signs of intellectual brilliance.

Multin's father was also a minister, and his brothers either served in the military or became clergy. Duka's family members either were ministers or married to ministers. Duke was the oldest of seven children, and after her birth, her mother became blind. Duke took over all of the household responsibilities and cared for her mother. Duke was the exception in her family. Because she had to tend to the household, she never received an education or learned to read or write like her siblings. She invented and created a variety of instruments that simplified her tasks and saved time with household chores, and she developed such strong management skills that Tesla's father regularly allowed her to manage business and church-related matters.

Duka's excellent memory allowed her to learn about cultures and communities quickly, and she could recite long philosophical works verbatim from memory. She was also a highly skilled seamstress, and her needlework was considered masterful.

Multin enjoyed writing poetry and current events and policy, and his work was published under the penname "Srbin Pravicich," which was Serbian for "Man of Justice." He was fluent in Serbo-Croat, German, and Italian.

Multin was originally made pastor of the church in Senj, and several years after his appointment, the new head of the diocese announced that he would be visiting all the parishes, and the priest who gave the best sermon would be rewarded with a prize. Multin decided to give a sermon on labor, and how it influenced spirituality, economics, and social problems. Several months later, the archbishop expectantly arrived in Senj and announced that Multin had preached the best sermon. Multin was awarded a red sash, and

shortly after, Multin was made the pastor at Smiljan. He was then put in charge of a much larger church in Gospic.

Tesla had four siblings and grew up in a farming community. Tesla saw his first train when he was a teenager. When Tesla was five, his oldest brother Dane, who was 12, died in a tragic accident. Dane was considered brilliant by his parents, who saw Dane as capable of achieving greatness. When Dane died, the expectations placed upon Tesla increased. Tesla strove to accomplish more than Dane, in order to honor his brother's legacy and alleviate his parent's grief.

Tesla was isolated from his peers and was more interested in exploring academic and intellectual concepts than playing games. While in school, Tesla's classmate received a brand-new fishing line as a gift. Tesla wasn't invited when a group of his peers went on a fishing trip to try out the new line. Tesla decided to create his own fishing line and hook and went fishing by himself. He wasn't able to catch any fish, mostly because he didn't use any bait, but caught over 24 frogs.

His classmates failed to catch any fish, and when they discovered how many frogs Tesla caught, they emulated his fishing line and hook, and the local frog population sharply declined. When Tesla was 5, he made his own pop guns, which he sold to his classmates. When Tesla was 7, and after starting school in Smiljan, Tesla and his family moved to Gospic, which was more urban than the farming community Tesla grew to love.

Tesla would attend his father's sermons, and one day after the sermon ended, when jumping down the steps of the church, Tesla tore the dress of a wealthy female parishioner. Many members of the congregation rushed back inside when they heard the commotion, and Tesla was ostracized by the community. The woman whose dress he destroyed was a wealthy socialite.

He had difficulty transitioning to city life. Most other children his age dressed in formal wear, while Tesla preferred work clothes, exploring the woods, and tinkering with mechanics. When he was 7, the newly established fire department hosted a parade when they received their new manually pumped hose, which replaced the outdated and inefficient bucket

brigade. The new hose would make putting out fires far quicker. When the fire department attempted to demonstrate the new hose for the townspeople, the hose didn't work. They were unable to get the hose to work even after trying to fix it for a prolonged period of time.

Tesla decided to jump into the river that supplied the water for the hose and fixed a kink in the vacuum. The kink prevented the hose from getting water. Once he fixed the kink, the hose worked, and sprayed and soaked the crowd. The crowd praised Tesla, and his reputation was restored.

When he was 9, he created a bug-powered motor. He two long, thin pieces of wood, and glued the together to form a windmill with a spindle and pulley system. He glued May bugs on the wood. When the bugs flapped their wings, it propelled the device for hours. He invited a neighborhood boy to admire his work. Instead, the boy saw a jar filled with May bugs, and ate the bugs. Tesla chased the boy away and was sickened by the sight of May bugs for years.

When he was 10, he graduated elementary school and entered the Real Gymnasium school. Tesla excelled in math and stated that he could envision the problem and solution almost immediately after being given a problem to solve.

Tesla spent much of his time outside of school learning. He had, like his mother, a near photographic memory. He learned German, Italian, and French. When he saw photographs of Niagara Falls, he viewed it as a potential power source.

When his father forbade him from reading at night, fearing that it would hurt Tesla's eyesight, Tesla snuck candles in to his room. When his parents found out, they started hiding the candles. Tesla responded by making his own candles using a tin mold, and he covered the keyhole of his door, allowing him to spend his nights reading books from his father's library.

Tesla also built his own crossbows and arrows, which shot further and straighter than bow and arrows and crossbows used by his peers. Tesla also had a fascination with flying. He regularly practiced deep breathing, which gave him the sense that he was lighter than he actually was. The type of deep breathing he did was over ventilating his lungs, replacing carbon

dioxide with nitrogen and oxygen, which could result in a somewhat minute feeling of intoxication. This resulted in him jumping off a roof with an umbrella when a he was a child, because he believed since he felt light, he could fly.

When he was 12 years old, when learned about air vacuums, he developed theories on how to apply crate a mechanism that could fly. He learned that a vacuum, which was a space in an enclosed container that had exhausted all air, was free from any type of pressure. Objects exposed to air, he calculated, were under roughly 14 pounds per square inch. Tesla believed that the pressure exerted on an object exposed to air was enough to turn a cylinder by turning half of the cylinder and exposing the other half to air. He made a wooden box with a cylinder and used a vacuum pump with a reverse valve to pull out all of their air. Eventually, the cylinder starter turning.  He was disappointed at how slowly the cylinder turned and figured that he could build a better working model.

While witnessing a storm when he was 13 years old, Tesla posited that lightning striking caused it to rain, and that rain was therefore controlled by electricity. He believed that he could use electricity to control the rain, and therefore prevent things widespread draughts that killed crops. Furthermore, being able to control rain could allow desert land to be turned in to farming land and would eliminate hunger.

Later, he discovered that although lightning appeared before rain, rain came before lightning higher up in the sky. In 1870, at the age of 14, Tesla graduated the Real Gymnasium in Gospic, and left with the reputation of a scholar. When one teacher gave him a less than passing mark in math, Tesla went to the head of the school and demanded to take the most difficult test in mathematics to prove that he deserved a higher grade. The headmaster agreed, and Tesla earned a near perfect score.

After graduating, Tesla was offered a position cataloguing the books at the town library. However, he became very sick, and doctors believed that he was going to die. Tesla's father worried that Tesla's academic rigor would be too demanding on Tesla and considered his son fragile. When Tesla shared that he wanted to pursue a career in engineering, his father attempted

to persuade him to join the ministry. Engineering studies were intense, and Tesla's father feared that Tesla would not be able to handle the demands.

Tesla was invited to attend the Higher Real Gymnasium after he turned 15 and lived with his father's cousin and her husband in Karlovac. Shortly after he arrived, Tesla contracted malaria, and the malady tormented him for years. Tesla graduated the four-year program in three years and decided to devote his career to studying electricity.

Weeks before graduating, his parents wrote to tell Tesla to not return home after the semester, and to instead take a hunting trip. Tesla ignored the directive, because he wanted to excite his parents with the news that he graduated a year early.

His parents were horrified when he returned. The reason they didn't want Tesla home was because a cholera epidemic was raging, and his parents feared that he would become gravely ill. His parents felt that a career studying electricity was too dangerous, and Tesla was faced with having to complete a mandatory 3-year term of service with the military. The day after he arrived home, Tesla contracted cholera. Tesla was bedridden for 9 months, and his family believed he would die. In desperation, his father promised to allow Tesla to attend school and study electrical engineering. Tesla eventually recovered.

After Tesla regained his health, he received a summons from the Army. His father advised him to take a one-year hunting trip to improve his health, and Tesla disappeared. He became a fugitive and faced jail time for refusing to serve with the Army. Tesla's father reached out to family members who were in the Army, and was able to obtain a waiver for Tesla, allowing him to avoid a three-year service term. He spent the year reading and developing new ideas.

He returned home to Gospic after learning that he was exempt from joining the Army, and he traveled to Gratz to study electrical engineering. He enrolled at the Polytechnic Institute in Austria in 1875 at the age of 19.

# Engineering Education

Tesla completed 9 courses during his first year and received the highest grades in all courses possible. He worked extremely hard and threw himself in to his studies. When he returned home after the semester, his father was upset. Unknown to Tesla, his professor wrote his father, urging him to withdraw Tesla. The professor was concerned that Tesla was overworking himself and could die.

During his second year, Tesla focused on physics, mechanics, and mathematics. His school received a Gramme machine, which one of his professors showed to Tesla's class. The machine would generate electricity if it was powered by a machine, or it could be powered by electricity and be used to produce mechanical power as a motor.

Tesla objected to the amount of sparks the machine emitted and argued that the commutator could be taken out and the machine could be powered by alternating currents instead of direct currents. Tesla argued with his professor profusely, suggesting that the machine could be simplified and didn't need a commutator. His professor dismissed his idea. He also spent more time associating and socializing with his peers, playing cards, chess, and billiards.

After graduation, Tesla planned to enroll at the University of Prague in 1878 but chose to take a high-paying job with a company in Maribor, which was close to his family's home in Gratz. He saved as much of his wages as he could and lived a very modest life. The savings were enough for him to pay for one year's tuition at the University of Prague, where he studied mathematics and physics. He continued to try to find a way to use alternating current electricity.

In 1879, Tesla's father died. Tesla left the University of Prague after graduation and secured a low-paying job as a draftsman with the Hungarian Government's Central Telegraph Office. Tesla originally traveled to Budapest in the hopes of working for Alexander Graham Bell's office. But when Tesla arrived in Budapest, he found out that there were not only no jobs available, but the project only being discussed.

He was soon promoted to a new position that oversaw the planning and development of telephone lines, which were installed in 1881 in Budapest. He became the head of the engineering department at the age of 25 and was very happy with his job.

## Career

Tesla took a position with the Continental Edison Company in Paris in 1882 installing indoor incandescent lighting. He was sent by the company to resolve engineering problems throughout France and Germany. Tesla also successfully invented a machine motor that used alternate current electricity. The Continental Edison Company was not interested in Tesla's use of alternate current electricity. He was sent to resolve significant lighting issues at Strasbourg Station, and promised a bonus if he was able to fix the issues.

Tesla provided improvements, designs, services and innovations to Continental Edison and was promised adequate compensation. When Tesla arrived at the company's Paris office, the company refused to pay him for fixing lighting issues in the Strasbourg Station and for improving motor, regulator, and dynamic designs. Tesla was entitled to substantial compensation, and although the company originally promised to pay Tesla, he was never paid.

He decided to resign from his position immediately. He planned to use his earnings to perfect and fund his alternate current inventions.

Tesla was convinced by Charles Batchellor, a manage at Edison Machine Works and a personal friend of Thomas Edison, to come to the United States and work with Edison. Tesla sold most of his possessions, and arrived in New York with 4 cents, a book of poems he wrote, several articles he wrote, blueprints for a plane, and mathematical work. He also had a letter written by Batchellor introducing Tesla to Edison.

While walking to Batchellor's friends house, Tesla stopped at a shop where he saw a man struggling to fix a machine. Tesla intervened, fixed the

problem, and the man offered him a job. When Tesla turned down the job offer, the man paid Tesla $20, even after Tesla protested. Tesla was shocked at how much the man thought his efforts were worth.

The next day, Tesla arrived at Edison's New York office. He was impressed with how much Edison understood about electricity considering he lacked formal schooling. Edison worked using a trial by error mentality, while Tesla carefully calculated potential outcomes before attempting to solve a problem. Edison also believed alternate current was useless.

Tesla impressed Edison when he was able to fix the electric lights Edison's company installed in the Oregon, which was the most advanced and luxurious passenger ship in the United States. Edison was told the system couldn't be fixed unless it was taken to Edison's shop, and the lighting couldn't be replaced. Edison sent Tesla to try to repair the fixtures, which he completed in under 20 hours. Edison was shocked, believing it would be impossible for the lighting to work again.

Tesla was promoted and pitched a plan to Edison to make the dynamos more efficient, which would result in a much lower operation cost for Edison. Edison said that if Tesla could successfully apply his ideas, he'd pay Tesla $50,000.00.

When Tesla completed the project, and his adaptations worked, he asked Edison for the $50,000.00. Edison told Tesla that he was joking, and Tesla resigned in 1885. Edison was likely joking, because his company didn't have $50,000.00 available.

After leaving Edison Machine Works, Tesla worked on developing an arc lighting system, and hired Edison's patent attorney, Lemuel Serrell, to submit and obtain the patents. Serrell introduced Tesla to Robert Lane and Benjamin Vail, who agreed to finance Tesla's business venture. The company, called Tesla Electric Light and Manufacturing, specialized in arc lighting and electricity related products.

Tesla invented and obtained a patent for a DC generator, and installed the system in Rahway, New Jersey, but his company's financial backers were disinterested in Tesla's alternate current ideas. When Tesla finished installing the utility system in New Jersey in 1886, his investors decided to

close the manufacturing portion of Tesla's company, focusing solely on providing utility service.

Since Tesla received a minute salary and accepted company stock as payment, when the investors formed a new utility company and abandoned Tesla Electric Light and Manufacturing, Tesla was left destitute. He signed all of his patents over to the company. He had to work as a repair man and ditch digger to make ends meet.

While working as a ditch digger in 1887, the foreman was impressed with Tesla's alternate current ideas. The foreman introduced Tesla to A.K. Brown of the Western Union Telegraph Company, who, along with his friend, attorney Charles Peck, invested in Tesla's project to perfect alternate current electricity.

Tesla formed the Tesla Electric Company in April 1887 and opened his laboratory on South Fifth Avenue. That year, Tesla created a working induction motor that ran on alternate current. It used polyphase current, and the motor generated a rotating magnetic field that turned the motor. The motor was self-starting and didn't use a commutator. His motor didn't emit any sparks, which made it far cheaper to operate, because mechanical brushes didn't need to be replaced.

Brown and Peck helped Tesla obtain the patent and market his invention. Tesla's AC motor was shown at the American Institute of Electrical Engineers in 1888, and engineers working for Westinghouse Electric and Manufacturing told George Westinghouse about Tesla's motor. Westinghouse needed an AC motor for products and services he was already marketing, and reviewed Tesla's design.

Brown and Peck negotiated a licensing agreement for Tesla's AC motor with Westinghouse. Westinghouse paid $60,000.00 in cash, provided stocks, and a $2.50 royalty for each AC horsepower produced by the motors. Westinghouse also hired Tesla for one year, paying him $2,500.00 per month to work as a consultant in his Pittsburgh office.

Tesla faced difficulties implementing his invention, especially with street cars. Westinghouse faced financial difficulties in 1890 due to an international economic recession, and Westinghouse had to both reorganize

his company and refinance his debts. The banks compelled Westinghouse to renegotiate his original contract with Tesla because the royalties Tesla was receiving were so significant. Surprisingly, Tesla agreed to release Westinghouse of his obligation to pay future royalties, even though Tesla could have easily enforced the contract. Tesla wanted his AC motor to be widely used and adapted and felt that Westinghouse's commitment to implementing his invention was worth more than royalties.

Tesla returned to his laboratory in New York in 1889, and, now independently wealthy, began pursuing other interests. He received roughly $500,000.00 from Westinghouse for his patents and inventions.

He invented the Tesla Coil in 1891, which produced high voltage, low current, high frequency alternate current electricity. He used the coil to experiment with x-rays, lighting, electrotherapy, and other endeavors. Tesla also became a naturalized American citizen in 1891.

He attempted to develop a wireless lighting system that could deliver electricity without wires. He was unable to find a commercial application for his discovery. He served as the vice president of the American Institute of Electrical Engineers from 1892 until 1894.

In 1893, Westinghouse completed a more efficient version of Tesla's AC motor, and completed their polyphase AC system, naming it the "Tesla Polyphase System." The company asked Tesla to attend the World's Columbian Exposition in Chicago. Westinghouse won the bid to provide the electricity for the event, which allowed them to demonstrate the safety and efficiency of AC electricity.

The demonstration helped Westinghouse acquire a contract to build an electric system powered by the Niagara Falls. Edward Dean Adams, head of the Niagara Falls Hydraulic Power and Manufacturing Company, sought Tesla's advice on how to best generate power from the Niagara Falls. Tesla suggested a two-phase AC system, and recommended Westinghouse as the utility provider.

In 1895, Adams helped set up the Nikola Tesla Company, which was created to fund and develop Tesla's current and future patents. Although his

wireless lighting system never gained popularity or support, the company handled all of Tesla's future patents.

On March 13, 1895, Tesla's lab was destroyed by a fire. He lost notes, research, models, and demonstration pieces. He built a new lab on East Houston Street shortly after. Many of his inventions and plans were lost.

He continued to perform experiments in his new lab, and in 1896, after Wilhelm Rontgen's discovery of the x-ray and x-ray imaging, Tesla began investigating the new technology. Tesla created his own x-ray machine that was powered by a Tesla coil. His machine was far more powerful than Rontgen's, but it wasn't as effective.

In 1898, Tesla created a radio-powered boat and showed it at Madison Square Garden. He used a cohere-based radio control. The crowd was mesmerized by the invention, and rumors spread that the boat was powered by magic, telepathy, and even a tiny monkey. Tesla attempted to sell the invention to the United States military. He called the process that controlled the boat teleautomation. When attempting to sell the invention to the military, Tesla marketed it as a radio-controlled torpedo. Following World War I, several countries began implementing remote radio control in their militaries.

Throughout the 1890s until 1906, Tesla spent most of his time and personal wealthy attempting to develop a way to wirelessly transmit electricity. He believed he could use Tesla coils to do more than provide wireless lighting. During this time, there was no effective way to wirelessly transmit communication signals across distances that exceeded one mile. Once signals were transmitted for more than a mile, they began to slowly die out. He built a large resonance transformer magnifying transmitter in his lab and formulated an idea to complete a system of balloons that could send and receive electrodes above 30,000 feet in altitude. He believed that the Earth's atmosphere was conducive. He believed that the balloons would allow for electricity to be transferred wirelessly.

In 1899, Tesla left New York for Colorado Springs to study the conductivity of low pressure air. He convinced John Astor IV, a prominent and famous businessman, to invest $100,000.00 in return for a majority share of the

Nikola Tesla Company. Astor IV was under the impression that he was investing in Tesla's wireless lighting system. However, Tesla used Astor's investment to fund his Colorado Springs experiment.

The El Paso Power Company agreed to provide Tesla free AC electricity, and Tesla told reporters that he was planning experiments involving wireless telegraphy. He used a large coil that produced artificial lightning, which consisted of millions of volts that discharged up to 135 feet. His experiment even burnt El Paso Power Company's generator and caused a power outage. He believed that, upon hearing the noise of the lightning strikes, that he could use Earth to conduct electricity and electric energy. The Century Magazine published an article about Tesla's Colorado Springs experiment, and published now iconic photographs of Tesla.

Tesla returned to New York in 1901 and began seeking investors for his wireless transmission system. He would take potential investors out for dinner and drinks at the Waldorf-Astoria's Palm Garden, The Players Club, and Delmonico's. J. Piermont Morgan contributed $150,000.00 to Tesla in March 1901 for a 51% share on any wireless patents Tesla obtained. Tesla used the funds to build the Wardenclyffe Tower in Shoreham, New York.

Tesla was competing with Guglielmo Marconi's radio-based transmission system, and unsuccessfully sought additional funds from Morgan in July 1901 to build a larger system. In December 1901, Marconi successfully transmitted the letter "S" from England to Newfoundland. Tesla attempted multiple times to obtain more funding from Morgan, trying to create a system for transmissions that used the "vibrations throughout the globe." Morgan never invested more money in to Tesla's project.

Tesla continued his project and relocated his labs to Wardenclyffe in June 1902. Investors on Wall Street were overwhelmingly backing Marconi's system, and began calling Tesla's project an elaborate hoax. Tesla discontinued the project in 1905. He ended up indebted and mortgaged the Wardenclyffe facility to pay his debts to the Waldorf Astoria. Tesla lost the property in 1915 when it was foreclosed on by the bank.

Tesla continued to try to find investors for his wireless system, and even sought funding from Morgan's son. He opened offices in Manhattan in 1906

in an attempt to attract investors. He rented offices at 165 Broadway from 1906 to 1910, the Metropolitan Life Center from 1910 to 1914, and on West 40th Street from 1915 to 1925. He had difficulty paying rent, leading to his eviction from multiple offices. By 1925, he was destitute and bankrupt. Many of his patents expired, and he had great difficulty attempting to develop new inventions.

He successfully crafted a bladeless turbine in 1906 and licensed it to a precision instrument company. The bladeless turbine was capable of exerting 100-5,000 horsepower but had few practical applications or uses.

Tesla was retained as an expert witness before WW1 by Telefunken, a German radio company. Marconi Company filed a lawsuit against Telefunken alleging that Telefunken infringed on Marconi Company's radio transmission patent. Tesla was paid $1,000.00 per month as a witness, but the case ended, as did his position as an expert witness, when the United States entered WW1 in 1917.

Tesla attempted to sue Marconi Company for violating his patent for wireless tuning but failed. Tesla and Edison were rumored to be the recipient of the 1915 Nobel Prize in Physics, but the award was given to Sir William Henry Bragg and William Lawrence Bragg.

Tesla applied for, and obtained, his last patent in 1928 for a biplane that could take of vertically. Tesla permanently closed his last office, at 350 Madison Avenue, in 1928.

## Late in Life

Tesla spent much of his life in the United States living at the Waldorf Astoria. He moved there in 1900 and racked up an excessive debt. When he was evicted for failing to settle his debts at the Waldorf Astoria, he relocated to the St. Regis Hotel in 1922. He continued moving every few years to a new hotel when he accrued significant unpaid bills. He moved to the Hotel Pennsylvania in 1930, and to the Hotel Governor Clinton in 1934.

Tesla moved to Hotel New Yorker in 1934, and Westinghouse Electric and Manufacturing Company paid all of his bills, rent, and a $125 monthly stipend until Tesla died. The monthly payment was written off as a consulting fee due to Tesla's aversion to charity.

Kenneth Swezey organized a celebration for Tesla's 75th birthday party in 1931, and Tesla was featured on the cover of Time magazine. Tesla enjoyed the gathering so much that he hosted an annual birthday celebration where he would serve home-made meals and share his new ideas and inventions.

In 1932, Tesla discussed a motor he created that ran on cosmic rays. The next year, he discussed how he discovered a new form of energy. The energy source would be capable of being managed by a cheap device and could run for 500 years. Some of the other ideas he shared were a device that could photograph the eye and read thoughts, and a means to transmit private radio wavelengths.

In 1934, he shared that he invented a death ray, which was a theoretical particle beam that could be used as a defensive weapon and was capable of ending wars. The blueprints and designs of the super weapon were uncovered in 1984, and it would emit particles that would charge metal slugs with millions of volts. He attempted to sell the design to the United States Department of Defense, the Soviet Union, the United Kingdom, and Yugoslavia.

He received the Order of the White Lion award from the Czechoslovakia ambassador in 1937. Later that year, while walking crossing the street, Tesla was struck by a taxi cab. He sustained multiple broken ribs and a severely wrenched back and refused to visit a doctor.

Tesla was found dead inside his room at The New Yorker hotel on January 7, 1943 by a maid. He was 83 years old. The Federal Bureau of Investigations ordered that all of Tesla's property and possessions be seized by the Alien Property Custodian. Three days later, John Trump, a professor at M.I.T. and aid to the National Defense Research Committee, released Tesla's possessions after finding that none of his property posed a hazard or risk to the public. Over 2,000 people attended Tesla's public funeral, and

the Mayor of New York read a eulogy over the radio. Tesla's body was cremated.

Almost a decade after his death, Tesla's nephew finally received Tesla's entire estate and ashes in 1953. Tesla's ashes were displayed at the Nikola Tesla Museum in Belgrade. Tesla never married and had no children.

# Henry Ford: A Biography

## Preface

Henry Ford rose from being a mechanically-gifted farmer to a titan of the automobile industry. His passion for machinery was realized in the form of steam-powered enginery. At a young age, he founded Ford, and the Model T would be born from his sweat, blood, and sacrifice. And as his philosophy on business matured into the rigid but practical vision that would help revolutionize the automotive industry, the man became an increasingly wizened veteran of the mechanical world. He established many firm points and opinions on business and the nature of the industry, sprinkling his autobiography (which was actually written by Samuel Crowther) with wise one-liners like: "money chasing is not business," and, "the producer depends for his prosperity upon serving the people". All of this from humble beginnings that never let the man forget that life was best spent near the ground, with oil and dirt on one's hands, away from fancy and flighty ideas, and best spent serving people with the tangible fruits of one's labors.

And despite many of his complex ideological leanings, the man-made understanding business and invention was a simple undertaking. An example of this type of thinking is that if one provides products, not for the luxurious, but for the average working man or woman, then that person makes the world a more streamlined place, as well as holding a majority stake over what everyone uses. His business model was simple: work hard and not for one's self, but for the people. And to do so, Ford believed that one had to abstain from alcohol and cigarettes. This, along with his hatred of financial greed, had a big influence on his own personal philosophy and work ethic. Ford did his best to live by these principles. So, as we unfold

some of the basic facets of this man of enterprise, we will also come across some of the more controversial aspects of his life. From his anti-Semitism to his failed jungle-utopia "Fordlandia," there is a lot of interesting things to learn about this man and the legacy he left behind. As a Getabstract state when summarizing Steven Watts' book The People's Tycoon, "Henry Ford did not invent the automobile, but he invented something bigger – twentieth-century America." And, as we shall see, Ford, despite his faults and ignorance on certain issues, definitely made his mark on the world.

## (Part One)

## The Young Henry Ford: A Mechanical Wunderkind

Like the old saying goes, necessity is the mother of invention—and from a young age, Ford understood that. He felt driven to probe the depths of his creative mind to find a solution to the incessant work that his family's farm provided. There was just too much work for any reasonable person to undertake. He wanted to ease the burden by inventing machines that would do the work for the farmers. In his autobiography, he expresses this sentiment: "There was too much hard hand labour on our own and all other farms of the time. Even when very young I suspected that much might somehow be done in a better way." Born in 1863, in Dearborn, Michigan, Ford started tinkering with machines on the family farm. Because of the influence of the bustling farm, he took his desire to lessen the workload of the average person to heart. And with the help of the inspiration he gleaned from both an engine and a pocket watch, his interest in mechanical things was piqued. Also, his hatred for farms increased alongside it, leading him to profess his dislike for cows, farm animals, and to only drink soy milk. However, his predominant preoccupation was with engines.

He described the first road engine he came upon as a machine that was "intended primarily for driving threshing machines and sawmills and was simply a portable engine and boiler mounted on wheels with a water tank and coal cart trailing behind." He knew from that age onwards that he was

going to specialize in an engine of that variety. That, along with a pocket watch, was the first to captivate his youthful mind. By the age of thirteen, he had successfully dissembled and assembled his first pocket watch. This feat, of course, usually only tasked to the most dexterous of technicians, and usually requiring years of training in a formal setting, was deftly tackled by a teenager. He professed with confidence that by the end of his fifteenth year, he was able to take apart just about any contraption and understand how it worked. He said that, “machines are to a mechanic what books are to a writer. He gets ideas from them, and if he has any brains he will apply those ideas.” All running machines were an inspiration for him, and quickly, he would graduate onto more and more complex machines to absorb ideas from.

## Leaving Home: His Apprenticeship and Early Inventions

By seventeen, Henry Ford had taken an apprenticeship at Drydock Engine Works. After finishing, Ford went on to invent a watch that kept two separate times: one for the railroad time, and one for standard time. It wasn’t a bestseller, but it made some people look twice in Ford’s direction. He then found himself working on the same sort of engine he had first been enthralled with. The wheels of invention had already been turning at that point, as he realized the physical limitations of the machine. He started to wonder how (not if) he could build a far more powerful machine that would exceed the measly twelve miles per hour that the Westinghouse machine managed. But it wasn’t a horseless carriage to drive around town that Ford’s mind was focused on. No, he couldn’t shake the image of his family and other families breaking their backs on the farm. His goal became “to lift farm drudgery off flesh and blood and lay it on steel and motors has been my most constant ambition.” But, he soon found out that not a lot of people were as enthusiastic as he was when it came to halving farm labor. The automobile garnered much more attention and, in Ford’s eyes, it also saved the backs of the horses that were forced to pull multiple passengers around town on a daily basis. It took a bit of self-convincing to put aside developing better farm equipment and instead looking to develop an

automobile, but eventually Ford started to envision the engine necessary for what would become the revolutionary Model T. That was years away from that point though, after much deliberation, study, thinking, and emulation of an engine already in circulation in England.

The new engine, instead of utilizing steam, was ran on a gasoline mixture. Ford said he came across this “Otto engine” while working at the Eagle Iron Works. Unsure of exactly how it worked, he took it apart and studied its inner-workings until he had at least an elementary understanding. He then built the engine himself and made sure he truly understood the four stroke technology that comprised it. From that point on, he had a hunch that steam engines were most likely going to become obsolete when it came to developing the vehicle he envisioned. The internal combustion engine was the future. And it didn’t take him very long to start developing his own gas-powered car. He called it the “quadricycle”. He states in his autobiography that once his clunky prototype logged its first thousand miles, he sold it for 200 dollars and sunk the money into further experimentation. Shortly after that, cars were becoming lavish signs of luxury instead of a pragmatic possibility for the average person. Ford cashed in on the opportunity to at least join the ranks of those who were modifying their models to go as fast as possible. Although he did not like to race himself, and had to hire a driver to drive his race car around the track, he would develop a few of his own race cars despite his dislike of the sport. He saw no other choice. Cars had then become a game of speed. And it was because of a race that Ford won—using his car the “999”—against many other competitors that he became confident enough and had built enough of a reputation to stake his livelihood on the formation of what would grow to become the Ford Company.

## The Ford Company: Henry Builds the Model T and Model A, and Adopts the Assembly Line

At first, like all fledgling companies, the Ford Company was a pretty crude undertaking. Ford describes the initial operations as such:

Since at that time we could not afford to buy machinery, the entire car was made according to my designs, but by various manufacturers, and about all we did, even in the way of assembling, was to put on the wheels, the tires, and the body.

The company would eventually grow in sophistication, but it had humble beginnings, much like Ford himself. The less than ideal operation also gave Ford the opportunity to get creative with not just the assembly of various vehicles, but the physical makeup of the vehicle itself. This meant that the car would have to be lighter in material—very unlike the unwieldy farming equipment he was familiar with. Eventually, his first commercial success was introduced: the Model T.

The T was the solution to what the car had been symbolized to represent; it wasn't only for the rich. No, it was for everyone. An affordable car was Ford's number one quest for production. He knew that if he designed and produced cars to serve the people, he would become an automobile tycoon. This isn't to say that Ford wanted to stifle competition or hold a monopoly on the automotive industry, he just wanted to make car ownership a reality, and that it would be foolish not to own a car. The Model T was his response to the sentiment that owning a car was impractical. According to a short article by History, "for the first time car ownership became a reality for average American workers, not just the wealthy. More than 15 million Model T's were built in Detroit and Highland Park, Michigan." On August 12, 1908, the first model was driven off of the assembly line and, immediately, sales were soaring for the Ford Company. As sales continued to grow in an impressive fashion, the prices also dropped, which led to even more production and mass-ownership. This was also thanks to the assembly-line means of production that Ford spearheaded.

Under the correct realization that not all men were mentally and physically equipped to skillfully produce things on a mechanical basis, Ford set out to standardize the levels of skill in the workplace. Intelligently, he did this by making one streamlined mode of production for the Model T. This meant that there was only one way to make the Model, for consistencies sake. And soon, the process would become so efficient and simple that even those who weren't normally physically or mentally capable enough could handle the

task of working what would be known as an assembly line for the production of Ford's automobiles. This was during the year 1913 as PBS chronicles: "Ford was inspired by the meat-packing houses of Chicago and a grain mill conveyor belt he had seen. If he brought the work to the workers, they spent less time moving about. Then he divided the labor by breaking the assembly of the Model T into 84 distinct steps. Each worker was trained to do just one of these steps." In essence, he broke up a very complicated task into discrete parts that the average person could be trained to do successfully. Ford did not introduce this concept abruptly, though. Instead, he gradually tweaked and planned the implementation of the assembly-line model. His idea would lessen the reliance on very skilled individuals with mechanically gifted minds to craft the cars, and would place emphasis on the skills of the average workman to perform smaller, far simpler mechanical tasks.

Also, with the introduction of the assembly line came a pretty hefty daily wage for his employees: $5 a day, which is around $120 in current value. This was a pretty drastic change for factory workers. Through the wage and the five-day workweek, Ford wanted to lower turnover rates as well as give his employees enough of a net to not feel the need to quit their jobs. His philosophy was that if you take care of your employees they will take care of you. Plus, it was nice to know that union strikes were probably not going to happen because of unfair wages or a demanding workload. Although there has been speculation on the exact motives for his increase in wages for his employees—one being that this pretty much guaranteed that the workers could then afford to buy Ford vehicles—but, regardless, the wages drove other car manufacturers in the Detroit area to follow suit, and raise wages as well. In addition to how much workers were taking home financially, more leisure time was given to every man. Some have speculated that Ford wanted the men to have more time to spend their hard-earned cash on Ford products; but, he also knew the importance of having well-rested employees. Morale was certainly better with more time off to recuperate. And the forty-hour workweek became commonplace; in fact, Ford may have been one of the first people to suggest the concept of "weekends" to the American working class.

Lastly, the Ford Motor Company started running into financial trouble as the Model T started to become obsolete. In 1927, the Model A would replace the T as the Ford Motor Company's signature car. This model had more up-to-date with features that other cars were beginning to possess as well. This means that you could choose from three different colors: black, green, or gray. The car was also less noisy and more reliable than the T (which hadn't been altered in years). The A would go on to sell millions and further cement the Ford legacy—and not a moment too soon.

## Edsel Ford

As important as Henry's contributions to Ford were, Edsel cannot be written off when considering the support he gave to his father. And in one of the biggest "what-ifs" in automobile history, what would have happened if Henry had listened to his son instead of berating and bullying him? After becoming the president of Ford, if Henry hadn't stifled his request to replace the Model T with the more modern Model A, they could have saved themselves the stress of Ford's quickly depreciating market shares. Fortunately for the company, Henry was forced to listen to Edsel and they developed the Model A together. The A was successful because it looked stylish—Edsel was put in charge of aesthetics (something he liked more than the mechanical aspects of automobiles), along with József Galamb. The A was, of course, a success. Sadly, this wouldn't be enough to prove to Henry that his son had what it took to be a trusted leader. Henry's ego barred Edsel from having a say in most company decisions and, as a result, Ford lost out on some very valuable help from his son. Tragically, Edsel would die of stomach cancer before Henry had the chance to hand over his empire to its rightful heir.

## (Part Two)

## The Controversial Henry Ford: Anti-Semitism

As so often happens with influential figures that have built an empire and thus have procured a large audience to preach to, controversial things often come to light—especially when those in question have such strong views and opinions on things, like Ford had. After Ford had spent a considerable amount of time as an automobile tycoon, he seemed to grow more vocal with his worldviews and denouncements. The strangest and most bizarre aspect of Henry Ford was his hatred of the Jewish people. He wrote a book called The International Jew, and he even received the Grand Cross of the German Eagle from Hitler himself for his very explicit denouncements of Jews. So, despite Ford giving a lot of valuable advice regarding business, production, economics, the automobile, etc., it pays to analyze the darker side of his personality as a way of understanding his full story. This, and his failed Brazilian experiment of Fordlandia, paints the man in a different light—that despite the positives of his life, he had some darker motivations.

To address the more controversial facet of Ford's life first, we can first turn to a paper that attempts to redefine the reasons for Ford's Nazi-centric thinking. In his paper titled, "Rethinking the Ford-Nazi Connection," Stefan Link states that there are often two opposing camps when considering the connection between Henry Ford and the Nazis: there are those who designate many, many pages to smearing the Ford name by his association with the Nazis—these are the muckrakers—and the other camp take a much more neutral stance in which they noticed the similarities between Fordism and the Nazi ideology who both looked to exhibit considerable control over the capitalist markets. Wherever the chips may fall, whatever the opinion, Ford was a pretty blatant Nazi sympathizer at a time when they were committing horrible atrocities. But, as Link wants to stress about Ford, perhaps the Ford-Nazi connection isn't the predominant result of a mutual hatred of Jews, but is instead a product which "sprung from a shared background ideology characteristic of the global interwar years." Link also goes on to say that even the Soviet Union adopted the Ford model of production, which points to a non-discriminatory dynamic between Ford and the Soviets' endorsements of his assembly-line paradigm—that is, the whole philosophy didn't exclusively align with Nazi ideals; the model wasn't only catered to the Germans. The Fordist model was just a good idea for sovereign nations who were looking to increase their economic output.

It also may have had a lot to do with Ford's autobiography My Life and Work which became a bestseller in Germany shortly after its publication.

The influence of Ford's autobiography would, according to Stefan Link, have far-reaching implications for the Ford-Nazi connection. Now, My Life and Work was not actually Ford speaking to his readership. Even though Link says that many to this day believe it to be so, it was more Samuel Crowther preaching his social ideas than anything to do with the Ford name. Because Henry Ford was a contrarian towards liberal capitalism and Crowther was as well, they both saw eye-to-eye enough to work together; Crowther was the mouthpiece for the pragmatic, anti-intellectual Ford. But, whatever the relationship the two had, their chemistry was apparently strong enough to sell books: around the world, from Germany to Brazil to Japan, My Life and Work became an international hit. It wasn't just the Nazis who jumped aboard the Ford Motor Company express train. As Link stresses again, "Ford seemed to offer something for everyone—employers looked to Fordist rationalization, unions to Ford's high wages, and conservatives to the Fordist promise of social harmony." But it was the Nazis who, in conjunction with Ford's other book, The International Jew, were the most vocal about professing their agreement with Ford's philosophy.

Having explored some of the deeper causes for the reason why Ford had such a strong connection with the Nazis through his business model and autobiography, his authorship of The International Jew definitely helped create the strongest connection. The reason for his authorship of such a vehement critique of Jewish culture is hard to pinpoint exactly. One would have to access the depths of his psyche to understand why he felt confident enough to sign and timestamp his name on a document rife with conspiracy theories and shoddy scholarship. To catch a glimpse of the scope of the multiple-volume book, this passage highlights the ambitious range of accusations to cover:

The Jew is the world's enigma. Poor in his masses, he yet controls the world's finances. Scattered abroad without country or government, he yet presents a unity of race continuity which no other people has achieved.

Living under legal disabilities in almost every land, he has become the power behind many a throne.

The book, which is a compilation of Dearborn Independent writings, consists of a smorgasbord of hate directed at the Jewish people. Inconsistent with how many view the father of the modern automotive industry, the anti-Semitic facet of his personality is definitely a bizarre part of his life. But, when speaking about the controversial episodes in his life, another stands out as being worth mentioning .

## Fordlandia: A Brazilian Jungle Utopia

In 1928, Ford cemented his decision to get into the rubber business. And the best way of doing that was to go straight to the source: to the rubber trees in Brazil, along the Amazon. He bought a very large plot of land in the Amazon and pumped an exorbitant amount of money into funding a small Ford community of workers. In this so deemed “Fordlandia”, he would build a factory, hire a huge amount of workers and task them with hacking away at the omnipresent jungle encroaching on the purposefully sterile community. Greg Grandin exhaustively chronicles all of these details, offering up an explanation for the formation of Fordlandia, “Fords frustrations with domestic politics and culture were legion: war, unions, Wall Street, energy monopolies, Jews, modern dance…cigarettes, alcohol...” All of these would become influential in Ford’s decision to try and model what the Puritans did when they came to the New World—he was trying to start over with Fordlandia. The Amazon was both the land of opportunity for cultivating the rubber needed for automobile tires, gaskets, and hoses, and it was a decision based on the principle that Ford wanted to fashion a tiny slice of the world according to his own design. Fordlandia became the place to both compete with the British and their monopoly on rubber, as well as establish a morally pure community of hardworking, ethical employees. That is hardly what happened.

Instead of fulfilling the vision of Ford, Fordlandia quickly turned into a chaotic, vice-ridden oasis for the majority of those who lived there. A part

of the reason for this was because the area was so remote, and so unfit for a factory smack dab in the middle of it. Ford had mistakenly believed that because he had helped change America in such a big way, that he too had the money and power to drastically alter a climate so polar opposite to America's. It was all hubris that led Ford to believe he could create a sustainable and profitable place in Fordlandia. And the more experts and well-meaning people told him how bad of an idea it was, the more adamant Ford became with Fordlandia. Despite his good intentions, his Fordlandia experiment was disastrous from the very beginning. There was "no sanitation, no garbage cans, flies by the million, all filth, banana peels, orange rinds…about 30 men sick out of 104, no deaths but plenty of malaria." And this account goes on longer in Greg Grandin's book. So, it seems, Fordlandia was doomed from the start. Eventually, revolts and rebellions would happen as a result of the strict lifestyles imposed on the men unfortunate enough to be stuck there.

It wasn't long after the formation of Fordlandia that there were accounts of prostitution and alcohol usage in Brazil. What Ford had delusions of keeping out of his pristine jungle community was happening in his absence. Also, as the jungle was being cleared in the early days, a lot of forest was burned and lives lost due to the extreme heat, insects, and malaria. Everyone involved with the project was miserable except those who were managing it from a distance. As more and more people were hired to try and salvage lost time due to mismanagement, sickness, and setbacks, still not a lot of progress was gained. The plantation of rubber was a slow-going process and that stalled the usual efficiency that Ford was used to operating under. In addition to these factors, he wanted to Americanize a place that had no desire to be Americanized. As Grandin states, "with reports coming in about drunken revelries in the Amazon, he insisted that what was law in America be company policy in Brazil." This didn't go over very well considering that discipline did not work when the workers hired made enough in a week's time to then quit their jobs and live off the money for a few months in the jungle. Or they would go to the brothels (along with a lot of Ford's employees) and enjoy their vices. Fordlandia would soon collapse in 1934, just six years after its formation. Henry Ford would lose close to

20 million dollars (208 million today) invested in the whole venture. It was a strange experiment that highlighted his hubris at the time.

## (Part 3)

## Ford's Later Years: His Philanthropic Efforts, Estate, and Death

After Ford Motor Company had risen to become one of the richest companies in the world, Henry Ford had more money than he was comfortable with. Well, according to the Philanthropy Hall of Fame, he was always pretty uncomfortable with holding onto his cash. This was evident by the fact that he "gave away about 33 percent of his income. By way of comparison, most people in his tax bracket gave away 5 percent." An opponent of get-rich quick schemes and Wall Street, he was more worried about the social impact a business could have versus any financial gain. As long as he made a good product and did his best work then the money would surely come. Whatever money he needed to put into the business he would, and a lot of the surplus was given to charity. But he did not want it to be advertised or his name to be attached to his giving—at least that is what he states in his autobiography: "Real human helpfulness is never card-catalogued or advertised. There are more orphan children being cared for in the private homes of people who love them than in the institutions." Although, as the hall of fame admits, there were some projects that were less than subtle on Ford's part. One being the Henry Ford Hospital in Detroit where Ford "served as its first president, and over the course of his lifetime, gave it about $14 million. To this day, it remains one of Detroit's largest hospitals." But, although this is an uncharacteristic display of showiness for Ford's standards, the amount of money he gave away is impressive.

In old age, and scaling back the amount of work he was doing, Ford would need to look to his son as heir of his empire. The logical choice would be Edsel, who had been by his side for years up until that point. Even though he had tormented him and manipulated him for years, he was Ford's only

child, so like the primogeniture of Shakespearean times, the estate would go to the firstborn. But tragically, Edsel died at 49 years of age. Henry Ford wouldn't die until four years later. And with that, his Grandson Henry II took control of Ford. The Ford legacy has lived on, not quite as strong as when Henry first rose to power, but still exists among the elites in the automotive world.

## Conclusion

Henry Ford was an extremely influential figure, who, despite his bigotry, still managed to impart many valuable lessons on those who choose to study his life. Mostly, that hard work, service to the people, and elbow grease had world-changing potential. His raising of wages in conjunction with the introduction of a five-day workweek was ahead of its time. And the assembly-line techniques he learned from a stockyard in Chicago was an extremely creative way to increase efficiency and productivity in the manufacturing of cars. He invented the quadricycle, which was arguably one of the first gas-powered automobiles in the states. He rose from the ranks of journeyman mechanic jobs and banked on the automobile as being worth the risk. That risk paid off and he changed the world and founded his lucrative company. Although he could have surely increased the value and vision of Ford if he had dropped his ego and listened to the ideas of his only son Edsel, he still left behind a legacy that has benefited and made the industry a more competitive place.

It will surely be interesting to see where the future of the automotive industry takes us. Will necessity create the crucial circumstances for a new Henry Ford to step up and synthesize a new revolution in the industry, or will we completely make the transition from fossil fuels to electricity? Solar powered cars? Will Elon Musk surprise us all and make the first flying car? Will we even need cars anymore? Will we look back to a simpler time and wish we never made more sophisticated vehicles? There are so many questions we could ask, but the point is that as long as there are people,

there will be creators and consumers, and the current capitalist model will most likely continue strong. Whatever may come, it will be an interesting ride.

# J.P. Morgan: A Biography

## Preface

J.P. Morgan is considered to be one of the frontrunners of modern finance. From the 19th century onwards, the investment world he helped create has had striking significance for the cultural climate of the world's banking system today and also for what banking will look like in the future. In his day, Morgan invested heavily in railroads and war bonds, and was considered to be the first financier to fuse both speculative banking with the more traditional brick and mortar style—something that the Glass-Steagall Act would abolish for decades until the bill was retracted and banks went back to the formula that J.P. pioneered. He was a large man with even larger ambitions and a mind for business. Having been groomed for Wall Street from a young age, he was skilled enough to take the reins from his father and steer the House of Morgan into profitable places.

Studying his life offers historical insight, as well as sociological nuance as a mass shift takes the financial district by storm. How this shift came to be and who were the catalysts of such actions are important details to consider, especially in current times where so many people are rallying for a change of pace in the banking industry. So many people still have bad tastes in their mouth from the 2008 financial crisis. So, how does Morgan's life, and the zeitgeist of late 19th to early 20th century America differ from ours now? Will the financial world be restructured soon? Will the largest investment firms evolve into something else entirely? How many crashes will continue to happen? Will a new J.P. Morgan rise from the ashes of modern banking

and revolutionize it into something completely unexpected? Regardless of how many hypotheticals we can surmise, the life of J.P. Morgan is a fascinating look into a very impressionable time in American finance. The plastic nature of the economy made it easy for Morgan (and others) to shape the industry in the way they wanted. For as Ron Chernow says in his book, The House of Morgan: An American Banking Dynasty and the Rise of Modern Finance, "perhaps no other institution has been so encrusted with legend, so ripe with mystery, or exposed to such bitter polemics." But before all of that, we need to look closer at the early years of John Pierpont Morgan.

## Part (1)

## How Junius Spencer Morgan obtained his Wealth and later Influenced his Only Son J.P. Morgan

Morgan was born in Hartford, Connecticut in 1837. He was the son of Junius Spencer Morgan, who had been in partnership with the very well-off George Peabody. Together, both Junius and George founded J.S. Morgan & Co., and Junius was promised to be handed the reigns after a ten-year stint of partnership—once Peabody was ready to retire. This would not happen as advertised, of course. The economy did not behave and things grew complicated as they often do in ten years' time. But at least, Junius Morgan, the ambitious patriarch of the family, would work his way into prominent wealth. As Ron Chernow says, this had a lot to do with the relatively lucrative economic climate of London when Junius first moved there. According to Chernow, "it was a more auspicious time for an American banker than it had been when Peabody was flogging the hated Maryland bonds in the 1830's." The end of the Crimean war signaled a downturn in

commodities relevant to Morgan's fortune (like wheat) and quickly, Morgan and Peabody were in trouble financially. Such is the downfall of dealing with extremely volatile commodities. Eventually both were bailed out by the Bank of England, but only after many had offered bailouts at exorbitant rates, leaving no doubt the cutthroat nature of the financial world. Chernow recounts that the Crimean War-induced panic "made an impression on Morgan's twenty-year-old son, Pierpont, who had just started on Wall Street as an unsalaried apprentice at Duncan, Sherman and Company." It also left an impression on Junius Morgan, who completely changed the way he banked and invested from that point on.

After Peabody had been suffering ill health for a considerable amount of time, Morgan took control of the firm in 1859. He would invest in war bonds during the Civil War—and with the chaotic happenings of battle, he would turn a healthy profit but then lose heavily whenever the Union lost crucial battles. This was a pretty commonplace practice at the time: "Such calamity trading wasn't thought bloodthirsty or reprehensible among merchant bankers but had an honored place in their mythology." J.P. was said to have sent his father, Junius, a telegram to tell him the news of the Union's victory and Vicksburg's fall, "in time for the elder Morgan to profit from a sudden rise in American securities." This very close relationship that J.P. had with his father really gave him an education in finances that was relatively unmatched at the time. J.P. was working Wall Street, and had a father extremely entrenched in that universe, so he was very influenced by these facets. The war-profiteering that the Morgan's participated in would be a very big reason why the family rose to the heights that they did. But first, as a much younger lad, Pierpont Morgan showed a lot of the personality traits that would make him a good fit for Wall Street. He also received the vocational training necessary to be successful when the time came.

## Young J.P. Morgan

It is said that at the ripe age of twelve, the precocious Pierpont was already registering small candies and treats he had purchased in a ledger and micromanaging his meagre weekly allowance down to the cent. He was

also being groomed as the eventual partner for Junius, like most sons of prominent families. Because Pierpont was now the only son of Junius—Junius Jr. having died at the age of twelve—he was the heir apparent, so to speak. Young Pierpont was duly trained to become a very adept businessman. This was done by his foreign schooling, where he was sent to Lake Geneva and then a university in Germany. Biography gives us the rundown on this episode of his life: "In 1854, Junius Morgan moved the family to London to begin his new career as a partner in the banking firm of George Peabody & Co. Pierpont was sent to the Institute Sillig in Switzerland, where he became fluent in French and displayed an aptitude for mathematics, and then to Göttingen University in Germany." The focus on giving Pierpont a cosmopolitan flair was important to Junius, as he knew that working with people and the ability of communication and persuasion would speak volumes to those he did business with in the future. Of course the young J.P. would eventually become one of the most influential businessmen in history because of his ability to communicate so well and to give aphoristic sayings to fit just about every situation.

## (Part 2)

## The Rise of J.P. and his Professional Career: Morgan Starts Working with the Railroads:

A big part of Morgan's fortune came from his dealings with railroads. At that point in American history, they were one of the most lucrative enterprises to be involved with. As Morgan was still establishing himself, it wasn't until he was involved with the railroads that things started really flourishing for him from a business standpoint. As the National Railroad Hall of Fame points out: "Morgan's railroad portfolio grew in 1877, when William Vanderbilt decided to sell his family's holdings in the New York Central Railroad after the death of his father, Cornelius "Commodore" Vanderbilt. Drexel, Morgan handled the sale of these securities, which took several years and resulted in J. P. Morgan becoming a director of the New York Central." With this directorship and the relationship he built with

Vanderbilt—who was one of the richest men in the country at that point, if not the richest—Morgan would further build up his reputation as a serious player in the world of business, and as a man of considerable industriousness and pluck.

Before he directed New York Central though, Chernow shows how invested he was in the railroad when Morgan was "picked to market the largest block of stock ever publicly offered—250,000 shares of New York Central. It was a landmark event for the Vanderbilts, who owned the railroad." It was Cornelius Vanderbilt who seized control of the railroad in 1867, but his death would mark a great opportunity for Morgan. After the death of Cornelius, his son William took control, owning "87 percent of the New York Central stock." Because he hadn't been trained to own the railroad, he wasn't a good fit for being heir of such a cash cow. Very unlike the father/son duo of Junius and Pierpont, the elder and junior Vanderbilts were at odds with each other instead of working closely together. Morgan would later benefit because of this and a little help from assembly hearings which penalized the Vanderbilts because of supposed slashed rates granted to oil refiners who used their railroads. William became nervous about the legal dealings and hoped that he could sell "a huge chunk of stock, thus making him [Morgan] a minority shareowner, the state legislature might relent." Because of Morgan's dealings with the English, he was the logical choice for owning a large stake in New York Central shares. And he was business-savvy enough to handle marketing railroads to a depressed world economy and a British populace already wary of being involved with more railroad deals. With his business acumen, Morgan sold New York Central shares abroad and made three million dollars in the process. His involvement and shareholding status also took some of the heat off Vanderbilt and made him less of a target from those who wanted to enact revenge on all railroad tycoons.

Because of who Pierpont's father was, he had the experience and connection with Wall Street to understand its nuances and the types of people who dominated the markets. He knew that the railroads were crucial when it came to securing a sizable fortune. As History states, "Morgan was heavily involved in reorganizing and consolidating a number of financially troubled railroads. In the process, he gained control of significant portions

of these railroads' stock and eventually controlled an estimated one-sixth of America's rail lines." Even though he was not a fan of the chaotic landscape that laying railroad track produced, he still made quite the name for himself with his involvements with railroads. Like John D Rockefeller at the time, and other so-called "robber barons," he wanted more organization and wanted to reduce competition like many prominent financiers of that time. Also, because of his experience in Wall Street, he knew that those who did the trading weren't the most trustworthy, so he sent out to be a moral figure among those who ran wild with corruption and dishonesty. Regardless of whatever his lofty visions for his place in Wall Street, or the sort of reform he was looking in enact, he was criticized heavily for sharing many similarities to the figures he said he was fighting against. Whatever his aims were, the young man quickly proved to be precocious in the industry, "at age twenty-four, he was the New York agent for George Peabody and Company. And in 1861 he formed his own J.P. Morgan and Company and tried his hand at erecting his own firm, but this may have been a little premature because it wasn't very successful; but, young J.P. got valuable experience supplying Junius with "political and financial intelligence." It was also around this time that the Morgan's would get involved in Civil War profiteering.

## J.P. Morgan and his Profits Gained by War: The Rothschild Formula and War Bonds

In one particular incident of his profiting off of Civil War events, he hired a man to buy guns that had been essentially stockpiled in an armory by the Union army because of their obsolescence. This was the event that has now been referred to as the "The "Carbine Hall Affair." By employing a technique called rifling that increased the effectiveness of the guns, he got a middleman to sell the Army their own guns back at "six times their original price." By this act, we can glean the very lucrative opportunities that war can bring. Anyone who has the power and influence to manipulate the outcome of the war can reap large profits. It wasn't just the ability to manipulate the outcome of war (or bet on it) that made war so profitable, it was that "bankers acquired such power because many governments in

wartime lacked the sophisticated tax machinery to sustain the fighting." This mean that banks with enough capital to support a government, could become buddy-buddy with said government and profit immensely because of that relationship. They loaned out money and then were repaid handsomely after the war, when it came time to settle debts. This is what has been called the "Rothschild Formula" named after the strategy employed by one of the richest families in history.

Rich with family connections, and "in an age before the instant transmission of information across the world, the Rothschilds had a network of agents across Europe in place to send news of key events." This happened during the Battle of Waterloo when Nathan Rothschild "quietly bought almost the entire stock market at incredibly low prices. When the news eventually emerged, the market rocketed, netting Nathan a fortune." The Morgan family would cash in on the same technique, using J.P. during the Civil War to relay information back to Junius. Much like traders and investors can make a fortune just by having key information a fraction of a second faster than their competitors, also knowing the result of a battle will net a profit according to how much you bet on the stock market. Knowing full well that certain victories would mean responses in the stock market, Junius and Pierpont made sure to bet in conjunction with the outcomes they knew would produce the most profitable net gains. Using this formula as well as developing their crucial relationships with banks during wartime was an important factor in the Morgan's wealth, but another crucial aspect was the emergence of war bonds. These bonds were very important in the amount of money that was to be made by financiers during that time.

A war bond, according to Investopedia, is "a debt instrument issued by a government as a means of borrowing money to finance its defense initiatives and military efforts during times of war." Around the time of the Civil War, debt was growing high enough to warrant the issuance of bonds to help curb the increasing deficit: "In February and March 1861, with secession already in process, the prospects of civil war growing, and the Treasury's cash position at a very low level, Congress passed two separate bills authorizing the issuance of $35 million worth of government bonds." To further cement the astounding role that bonds played, and would continue to play for the U.S. during war, this excerpt shows the

effectiveness of war bonds when governments need funding: “by the end of the Civil War, the USA had financed about two-thirds of its $3.4 billion in direct costs by selling bonds.” Having these tiny slips of paper drive such a giant mechanism of the country made it imperative for the Morgan’s to try and profit off the bonds. These bonds were a definite investment opportunity. Even much later, after J.P. Morgan had died and the United States was involved in a much larger conflict, The House of Morgan would help fund the army during World War II, as well as bet on bonds again. Because the Allies were so desperate for cash, The House of Morgan set up a deal with them for a lucrative deal that would supply the Allies with the funds they needed: “In December 1914 at a meeting with Prime Minister Herbert Henry Asquith (1852-1928) and Chancellor David Lloyd George (1863-1945), Davison presented a proposal to make Morgan a purchasing agency for the British.” This also would mean a hush-hush deal between Woodrow Wilson and J.P. Morgan to allow for the speculation and sales of war bonds.

## (Two Key Events in the Life of J.P. Morgan)

### #1: J.P saves America from Default in 1893

It’s hard to accurately judge the motives of J.P without bringing into consideration the fact that he may have been only looking to net significant profits. Most of his acts seem a little self-serving if looked at from a pragmatic (perhaps cynical) point of view. Regardless, he did do some pretty significant things while he had the means to do so. To start, he did some legal digging to prevent the U.S. from a crisis involving the value of gold: “the crisis stemmed from the post-war railroad boom that triggered a series of bank failures and a run on gold. By 1895, the country's gold reserves had dwindled.” Because everything was tied to the Gold Standard, when gold prices dropped, the entire financial structure reeled as a result. If the banks didn’t have enough gold in their reserves, then it could spell disaster for the relative value of the dollar in circulation. As Jean Strouse

says in her book on Morgan: "Since there was no income tax and the government had no power to issue money, the Treasury had to buy or borrow gold in order to maintain its reserve — and its ability to borrow depended on foreign confidence in the dollar." Washington wanted to always keep close to 100 million dollars in their vaults to guarantee that their fiat currency was backed by actual resources—keep in mind that this was before the Federal Reserve, so the only thing that really gave paper currency any tangible value was the physical gold it was tied to.

As a result of the conundrum that Washington faced, Morgan did some legal digging which was crucial for finding a solution for America's financial maladies: "As the situation worsened, Morgan told the president he had located a still-valid 1862 law, passed during the Civil War, that authorized the Secretary of the Treasury to issue bonds to buy gold coins without having to get congressional approval." Because they were in desperate need for gold to plug the holes in their reserves, the bonds would become a lifesaver that saved America from recession. Because Congress was not allowing the issuance of bonds, Morgan was forced to be creative with a solution for the debt: the final terms were something like the following: "The government will buy 3.5 million ounces of gold coin from the bailout team at $17.80 per ounce, in exchange for $62.3 million worth of 30 year bonds paying 4%. The price of gold is actually $18.60, so the government ends up paying for $65.1 million in gold in exchange for $62.3 million in bonds — paying a $3 million premium." As complicated as the details actually were, Morgan pulled off a feat that stopped the gold crisis and quelled the panic that was already in full swing around that time. The next key event that he would mastermind would be bailing out Washington close to a couple decades later, when another panic was happening.

## #2: J.P.'s Reverse Bailout during The Panic of 1907

In what would be an act that would make Pierpont extremely famous, he bailed out the banking system and rallied other financiers to help as well. This needed to be done because America had no central bank at the time.

The importance of a central bank has to do with the reserves in circulation. Basically, at the time, there was a massive chain of withdrawals. Because the bank only kept so many reserves in their vaults they had to keep requesting money from the banks they had themselves deposited at because they were collecting interest from those banks—and so on and so forth, until there was a giant withdrawal where reserves were being called in all directions and the whole convoluted process collapsed on itself. Essentially, "a panic could start among small rural banks and spread up the chain of banks. It could also go down the chain after the failure of banks on Wall Street." Banks started shutting down and the system was panic-prone "because if their bank failed, they would lose all the money they had deposited. Unlike today, no government insurance program guaranteed bank deposits."

Enter J.P. Morgan. He essentially pumped enough of his cash into the economy to cover these reserves. Because of what had been a "scheme to capture the stock of the United Copper Co. and drive up its price," a panic was caused due to associations with this scheme and Knickerbocker Trust, and a chain of withdrawals started. Pierpont would save the day: "Morgan put together a $25 million "money pool" for making lower interest loans to them, avoiding an almost certain stock market crash." He also purchased around thirty million dollars in city bonds, making some doubt the real reason for his generosity. This cynicism of his motives for bailing out New York are pretty warranted, given that he would probably rake in a fortune from those bonds once the city recovered. It could also be that his motivations were driven by the fact that if a stock market crash really happened, he would be worse off than if he hadn't intervened to begin with. Regardless, this episode of his life is an important one to make note of. He is almost always known for his solution for the panic of 1907. It is as Chernow has said, it was "Pierpont's last hurrah" at age 70, well beyond the prime of his life, and perhaps wanting to give back to the institution that had given him so much over the years. Eventually, all this effort would be moot as the Great Depression ended up forcing most countries off of the gold standard entirely. A lot of experts agree that because of the Gold Standard, economy was worse off because the Federal Reserve wasn't able to print the money needed to get America out of the dumps. Regardless of

the reasons for the historic plunge the stock market took, everyone was affected. J.P. Morgan took a big hit as well. The House of Morgan was so wealthy that even with their riches halved, “they still had wealth left from the twenties.” It was probably a good thing that Pierpont didn’t live to see the downtrodden economy, but he still wouldn’t have suffered on the same level as everyone else because his enterprise was impressively well-off even though the nation was in such dire straits.

## (Part 3: J.P.’s Legacy and Death)

## The House of Morgan during the Great Depression

As Chernow states so bleakly, “the Wall Street of 1932 was a dismal ghost town.” Everyone was miserable besides those who had predicted the collapse and would later reap the benefits of those investments. While so many people were out of work, President Herbert Hoover did his best to try and encourage spending, so that the economy would have some life pumped into it; it desperately needed it. It didn’t help and his rhetoric and strategies were ineffective. Surprisingly through all of this, the House of Morgan was doing very well considering the scope of the disaster. The heirs of Morgan’s empire would actually have the problem of trying not to live their lavish lives of luxury too conspicuously, while everyone else was suffering. They seemed to put up a façade which masked the true nature of just how rich the enterprise still was, but as Chernow shows, they still took considerable losses: “if the Morgan world seemed to survive the Depression intact, the surface was deceptive. Between 1929 and 1932, the bank saw its net worth drop with frightening speed from $118 million to half that before Hoover left office.” Because J.P. had always believed in treating his employees and partners with as much respect as possible, his son (and heir of the business), “Jack,” made sure that everyone still had their free lunches and their vacation spot in Maine. In other words, “their Depressions suffering, if real, was extremely modest compared with the unspeakable suffering beyond the marble walls.” It was because of this inequality in suffering, so to speak, that the Glass Steagall Act grew to be such a mainstay in American politics

at that time (arguably, even now): keeping the rich out of the pockets of ordinary people and speculating with their assets would become a criminal offense on paper. Part of the reason this act was accepted is because of the disparity of suffering. Eventually, of course, as the economy healed and the depression wore off, the House of Morgan would get back to work.

## Notable Companies that J.P. Invested in and Helped Form/Philanthropic Efforts:

In addition to continuing the company his father started, he was a shareholder for many big companies that are now giants in the industry. One of them was General Electric from which the Edison was the chief founder and J.P. Morgan, who eventually became the majority shareholder. This majority shareholder status was the result of Morgan losing some big projects "such as the World's Fair in Chicago and the Niagara Falls Power Plant to Westinghouse Co., which infuriated him. He bought more stock in Edison General Electric to have a majority share, fired Edison, converted over to AC, and formed a merger with Thomas-Houston Electric Company to create General Electric." J.P. would also come to hold a lot of shares in AT&T. In addition, in 1901, "he led the consolidation of Carnegie Steel Company with several other similar concerns, creating history's first billion-dollar corporation in U.S. Steel." He wouldn't just invest money for profit. Like most entrepreneurs who have been successful throughout their lives, Morgan put his money into something very worthwhile and not readily liquid or meant to be sold for assets. In Pierpont's case, he invested a lot of money into collecting pieces of art.

The philanthropy roundtable says that Morgan was "America's greatest patron of the fine arts. He began collecting art while touring Rome, not long after finishing at Göttingen at the age of 19. It was the start of a lifelong love affair." It was because of his efforts that the Metropolitan Museum of Art is a reality today. Something that might be unknown to some about Morgan is that he was also a fan of science. He was "a trustee of the American Museum of Natural History for 44 years, Morgan served on the board from the museum's opening in 1869 until his death in 1913. He was

often the museum's lead donor—frequently giving under condition of anonymity—and he served at various times as vice president, treasurer, and finance committee chairman." It is his interests and philanthropic efforts that perhaps complicate the damning portraits most paint of him, as some cutthroat oligarch with a carbuncular nose and a vitriolic temperament. He was a rich, privileged boy who was groomed to become a successful businessman, was an investor who flirted with speculation and riskier bets, and ultimately it all paid off for him. It had paid off for his father Junius, and it would pay off for his successor "Jack" Morgan. To this day, J.P. Morgan is going as strong as ever. Although, there is just as much animosity as there was when Pierpont was at the height of his career.

## Afterword: The 2008 Financial Crisis and Today's J.P. Morgan

Perhaps Pierpont would have found it hard to fathom that he would bail America out in 1907, and then a hundred and one years later the tax payers would bail out the multi-trillion dollar JPMorgan Chase for putting average to below average income households (for the most part this was the demographic, but it affected everyone who had a sub-prime loan) with fake, AAA-assured loans that were in fact junk that was painted and sold to look like golden, factory-approved loans to people who could afford them. What happened was that taxpayers were getting loans with outrageous (sub-prime) interest rates and soon, those who didn't have the income, but had been approved through faulty and shoddy means, would default on their loans. This happened to a lot of people, and those who knew what was going on bet against the mortgage industry and made a killing by shorting stocks. J.P. Morgan was in on the scam and was creating a bubble that would eventually pop and leave many without homes, without money, and the banks that were "too big to fail" had to be bailed out. Ever since this incident, Wall Street has once again fallen out of favor with most Americans. Bankers are allowed to gamble with people's money, as the Glass Steagall act was repealed in 1999. All of these details brings this back to the questions posed in the preface: "Will the financial world be restructured soon? Will the largest investment firms evolve into something

else entirely? How many crashes will continue to happen? Will a new J.P. Morgan rise from the ashes of modern banking and revolutionize it into something completely unexpected?" The indications seem to be that everything is cyclical, like most of history, and that just as panics and depressions and crises happen in the economy, so too will there be figures just like Pierpont, Rockefeller, Carnegie, Buffet, and Gates who will rise and make the world either a better place or a worse one. Sometimes the lines aren't easily drawn, but we can at least study their lives and learn from them.

# John D. Rockefeller: A Biography

## Preface

The enigmatic oil tycoon, John D. Rockefeller, has been written about exhaustively. He is so enshrouded with mystique and allure that biographers usually only skim the surface of his personality, instead of coherently crafting a complete picture of the man. He was both ghost-like and omnipresent at the same time—in the spotlight and then out of sight at the drop of a dime. John T. Flynn tells us that Rockefeller "has been grilled, exposed, turned inside out. Yet he has remained actually one of the most completely unknown men in American public life."

Although biographies of him often top a thousand pages in a restless scramble to pinpoint every facet of the man's mysterious ways, they often fall short to adequately account for a man of such paradoxical polarities—by these polarities, I mean that Rockefeller was both an espoused Christian, fervently upholding the ethics of the church, as well as a trust-holding monopolist with as many enemies as hairs on his head. In fact, John T. Flynn reminds us that President Roosevelt made it a point to specifically "trust bust" Standard Oil because he thought that Rockefeller was a "law breaker." But some biographers do in fact make it a point to meet halfway between the two usual points of interest that are normally fixated on just

how terrible of a man he was and the sycophant accounts which build him up to be this lofty, praiseworthy figure who could do no wrong. The biographer who splits the difference in order to obtain a balance finds the largest kernels of truth amongst the purposeful manipulations of the very crafty Rockefeller. In his mammoth-sized biography about the aforementioned figure, Ron Chernow provides the balanced account necessary for a crystal-clear picture of the elusive man. John T. Flynn's biography is also a very important tool on this hunt for the real Rockefeller.

## (Part 1)

## The Early Years of John D. Rockefeller: Parents, Influences, and Beginnings

This story starts in the year 1839 in Richford, New York, where Bill Rockefeller and Eliza Davison had John Davison Rockefeller. Like the majority of stories about key figures in history, to understand Rockefeller, we first need to consider the impact his parents had on his mentality. However, in this case, his father would have the most influence on the young John. And although some might write off the psychological influences that parents impart on their offspring, we can safely assume that William Rockefeller's profession may have had a considerable influence on the future businessman John Rockefeller. Either it taught him to never be like his Father, or he learned a thing or two from the man. You see, by trade, William (Bill) Rockefeller was a con man; he was a snake-oil salesman of sorts and this facet of his personality may have instilled certain entrepreneurial philosophies onto the future Tsar of Standard Oil. Flynn makes reference to how Bill Rockefeller had everyone scratching their heads about the nature of his vocation; that is, they wondered where he had gone to, and how he had procured the things he did. "He would be gone for months at a time. Then he would come home, always unheralded and either astride a good horse or driving a decent-looking rig." "Big Bill" as everyone called him, was a mysterious man with a gift for gab.

This well-traveled, silver-tongued salesman seemed to be doing quite well for himself. He was a flirt with most women, a teetotaler for the most part, a skillful raconteur, and an all-around likeable fellow. But most were not sure how he achieved any livelihood until he explained to them that he was a traveling salesman who “sold medicines and traveled about to do it.” That’s also what he told the future mother of John Rockefeller (Eliza Davison), much to the suspicion of her father. Bill and Eliza would soon get married (without the blessing of Mr. Davison of course.) But if we analyze the reasons why Big Bill Rockefeller became such a successful snake-oil salesmen, we only have to slightly analyze the cultural climate of New England around that time.

What was known as the Second Great Awakening was in full swing, which was fortunate for a huckster because “the young, enterprising New Englanders were especially susceptible to such movements, and the consequence was a surge of ministers and revivals in the new towns by the canal.” Essentially, John D. Rockefeller’s father was profiting off of the “burned-over” environment that had pervaded the New England environs. Instead of participating in the religious events though, he would affix “a slate to the front of his shirt saying ‘This man is deaf and dumb,’ and proceeded to hold written conversations. Only the hardest of hearts would deny him a meal and a place to stay with such a handicap weighing against him.” But where he made money was through the “sale of patent medicine. For instance, he sold a "cancer cure" that was part oil, part laxative. Once he sold the medicine, Rockefeller generally tried to leave town as soon as possible, definitely waiting for no more than an hour.” This meant that he would be gone for months at a time. That was just Big Bill Rockefeller. And as Ron Chernow states in the prelude of Titan, the old Rockefeller, after being interviewed to set the record straight about certain accusations that had been made about him from other writers, was thrown into a rage when he heard slanderous things said about his father William Rockefeller. “This thrust against his dead father probed some buried pain, some still-festering wound inside Rockefeller, and he suddenly erupted with explosive fury.” This shows, that despite the dishonest methods that William Rockefeller used, he clearly had a considerable influence on the young man who would later compete with Carnegie for being the world’s wealthiest man. Also, the

marriage of William and Eliza was far from perfect, “setting the stage for all the future heartache, marital discord, and chronic instability that would so powerfully mold the contradictory personality of John D. Rockefeller.”

## A Need for New Sources of Light Along the East Coast

In conjunction with Rockefeller’s development as a boy of considerable cunning, the technological climate of New England was shifting. There was a need for an alternative light source. The lamps from whale lard and oil were used, as well as gas lamps if you had the money, but there wasn’t enough light for “larger factories, railroad trains traveling at night, steamboats on the rivers—all these things needed light.” Those on top, “the oil men” of that time, were a part of the lucrative but volatile whaling industry—those who actually went out on whalers and procured the whale oil for lamps. But soon petroleum would become the most valuable oil, and Rockefeller would be king of that realm in due time. It took a few years for that to be the case though. Some years after petroleum was first barreled with the intention of selling, first for its medicinal qualities and then later realized as an important energy source—but it did eventually happen.

As the scope of industrialism grew, the need for more robust energy sources also reared its head. Most factories were waterwheel-powered and thus geographically confined to water sources. But more efficient fuel sources would lessen geographical dependence and proximity to water, making factories more a matter of “when?” than “where?”  The railroads made sending goods a cheaper activity, and technologies continued to expand. The mass industrialization of America would also usher in the formation of more corporations and monopolists who exercised their dominance over every conceivable market. Rockefeller would be an infamous example of this dominance.

## John’s First Taste of Business and the Events that led him to Oil

John D. Rockefeller first started making a name for himself as a precocious young office worker who tended the books of Isaac Hewitt's firm. History provides the details on this episode of his life, where "in 1855, at age 16, he found work as an office clerk at a Cleveland commission firm that bought, sold and shipped grain, coal and other commodities." After working for some time without pay, as it was customary to work for free while your employer "taught you the ropes," he started keeping his own books in a ledger be bought with his own money, on the mere dimes he owned for himself. Later, when he was finally paid a portion of his earnings, he would end up designating the majority of it to the church and other people he wanted to buy gifts for. Although, as Flynn states in God's Gold, Rockefeller was very much blamed for using his religion and his exorbitant donations for the purpose of lessening the public's animosity towards his dominion, Flynn also reminds readers that even before he had the means to support himself, he was always giving away at least a tenth of his earnings to the church. Of course, as his status reached the epic proportions they would later morph into, the donations came to seem a little disingenuous.

Shortly after having left Isaac Hewitt's firm because he wasn't being paid enough, John met Maurice B. Clark, "who worked down the street at a produce house called Otis, Brownell." They were classmates from their community college days and got along fittingly. They would eventually go into the produce business together, "with each partner investing an initial $2,000—an amount equal to $36,000 in 1996 dollars." He was short the money required to invest, so he had to borrow money from his father Big Bill at a whopping ten percent interest rate! He was just eighteen years old at this point and had his own partnership. He was quite successful at first with his new partner Clark. They collectively made three times the amount that John had made when he worked at the Hewitt firm, but he was plagued by Big Bill again, who would continue to bail his son out of dicey financial situations with his highly impractical loans. Eventually he would pave his own path to further success through sheer determination and hard work, and not require any of his father's subprime-like loans.

Because of Edwin Drake's discovery of oil in 1859, the oil boom was in full swing. But it wasn't until around the year 1863 that things started to move along for John D. Rockefeller and company. Although they would not yet

form Standard Oil, John, his brother William, Henry Flagler, and Samuel Andrews caught wind of the importance of oil and the possibility to build an empire from it. As Flynn reminds us, at that point, crude oil was selling for ten cents a barrel, "its lowest estate." Rockefeller had been interested for a long period of time in the industry and was waiting for the right time to invest. He eventually pulled the trigger on a small investment in the firm of Clark and Andrews, two associates and friends of Rockefeller, and they would prove to be his "in" for oil. At the age of twenty-two, he had started his journey into the world of oil. This would start a chain reaction of other investments and co-ops with like-minded men of business in the Cleveland area. But as Chernow says, when it came to Rockefeller's initial relationship to oil, surprisingly "John D. Rockefeller didn't behold its potential in a sudden revelatory flash but made an incremental transition from produce to oil." Regardless of the slow uptake, his involvement in the oil business was certainly moved along by his friendship with Samuel Andrews, who was a chemist and became a firm believer in the power of kerosene. Because of the enthusiasm of Andrews, both Rockefeller and Clark sunk $4,000 dollars into an oil refining project. Things would sort of take-off from there.

## (Part 2)

## Establishing Standard Oil

It took a little bit of time for Rockefeller to learn the ropes of the oil business, but he was a quick study. Fortunately, anybody even remotely close to an oil rig profited immensely. But like most extremely popular economic booms, there came to be too many people setting up derricks alongside everybody else. The resulting overproduction of oil led to the logical reduction of value in oil, and soon an overabundance of the commodity led to a deflationary reality for all subsequent barrels tapped. As Chernow states, "Rampant speculation had so overbuilt the industry that total refining capacity in 1870 was triple the amount of crude oil being pumped. By then, Rockefeller estimated that 90 percent of all refineries were operating in the red." Despite this very calamitous time for everyone

rushing to get their piece of the profit, and despite Adam Smith's invisible hand not sharing a one-to-one relationship with the failing oil industry, Rockefeller realized that he had better act quick if he wanted to stay in the black with his business venture.

He came to the conclusion that the chaotic, rebellious, and wild oil industry needed to be bridled. "Rockefeller would have to tame and discipline it." He planned to do this by creating designated property for the extraction of oil. If you owned "incorporated land" you were then the only one with any legal right to extract oil in that area. If you owned enough incorporated land, you had more oil, and you could, in essence, control the fate of the market. Instead of overproducing, like oil had been for so many chaotic years, the drilling of oil was kept under firm control. If you controlled all of the land, there was no competition when it came to oil. You held a monopoly on it if you could grab the land before everyone else. And of course, the perfect time to act was when most investors were fleeing from the oil rigs with reckless abandon, all trying to at least make some money back from what they had incorrectly assumed was a bottomless pit of money. This was Rockefeller's obsessions shortly after, and without it, Standard Oil surely would not have risen to the heights that it did.

After coming up with the incorporation idea that was legally approved by the powers at be, Standard Oil started to gain more power. This was made plain by the fact that Rockefeller already owned close to ten percent of all of the oil that was being refined at that time. Rockefeller himself was really confident that he would someday earn all rights and land for the procurement of every ounce of crude oil in Ohio. He stockpiled the most shares out of his partners. But curiously, none of the men had salaries, opting instead to trust the value of the shares they held. And because of the recent and tumultuous events surrounding all speculative markets, it was very hard to find investors for Standard Oil. Rockefeller took that personally. After some deliberation on the issue, he slowly but surely bought up as many rival oil ventures as he could. He also became partners with the head of the Pennsylvania Railroad, Tom Scott. He was pretty much forced to do so because the Pennsylvania Railroad controlled most of the transport territory of the entire east coast—not greasing a couple palms would have been commercially moronic. Investopedia gives us a brief

explanation for how he went about entrenching himself in the railroad industry: “bothered by the inconsistent support of competing rail companies, Rockefeller backed the creation of the South Improvement Company to improve the transport costs for his company. He also agreed to help this company buy up all the railroads in return for bulk rebates.” This essentially would not work out the way that Rockefeller wanted it to, and thus he was forced to up the ante—he would invent the “trust” as a result. It was because of this ability, to do whatever it took for Standard Oil, that he became as influential a figure as he did—even if the relationships he harbored and the deals he made, made him one of the most hated men in America.

## Rockefeller Successfully Monopolizes, and Roosevelt Rallies Against Corporate Greed

After failing to achieve what he set out to achieve with the railroad organization, Rockefeller saw it best to monopolize. He did this by setting up a trust for the Standard Oil conglomerate. This was done by drawing up the Standard Oil Trust Agreement. As Brittanica highlights, “By the agreement, companies could be purchased, created, dissolved, merged, or divided; eventually, the trustees governed some 40 corporations, of which 14 were wholly owned.” This would lead to the formation of an extremely convoluted network of corporate control. To the legal system, the trust meant that the comings and goings of Standard Oil were hidden behind subterfuge and complicated processes meant to obfuscate the true nature of the beast. According to Ida Tarbell, “You could argue its existence from its effects, but you could not prove it.” This made it extremely hard to prosecute Rockefeller for breaking anti-trust laws put into place by the Sherman Act of 1890. It would cement the public perception that Rockefeller was an advocate for anti-competition. This flew in the face of the fairness that capitalism was supposed to represent. Small businesses were supposed to be able to thrive through elbow grease and sacrifice and were supposed to be ruled by natural forces in the marketplace, not the artificial means of who they saw as a control freak. Rockefeller would

become one of the wealthy elite also derogatively known as a “robber baron” by the public. Supposedly, the allusions to robber barons were derived from German bandits who robbed and taxed those who encroached on their territories. It was a witty moniker for those that Rockefeller shared elite company with, like Carnegie, J.P. Morgan, and William Randolph Hearst. But because of these men, Theodore Roosevelt and others were working to stifle what many saw as the tyrannical reign of the wealthy elite.

By the time Teddy Roosevelt was in office, the Sherman Act had been largely ignored for over a decade. The trust-busting president set out to work against the commodity super-elite, who were taking away fair competition from all of the other entrepreneurs. At first, he went after J.P. Morgan in 1902. It would take two long years for the president to make any progress against the Northern Securities Company—“a colossal railroad trust which threatened any chance of competition”—that Morgan was in charge of. Persistence was key for Roosevelt as, “the U.S. Supreme Court voted five to four in favor of the government, ordering the NSC to be dismantled.” This was a historic victory for most, and it probably made all of the elite a little nervous at the time. The “victory served to re-define the highest court's view of trusts, stopped an impending national railroad consolidation in its tracks, curtailed public interest in holding companies, and made Teddy more popular than ever among the average citizenry.” Of course, Roosevelt had a larger enemy in Rockefeller, who was in control of the largest monopoly in history with the Standard Oil Trust. It would take seven years for it to be dissolved into smaller parts. But first, as a NY Times article recounts,

The Department of Justice filed a federal antitrust lawsuit against Standard in 1909, contending that the company restrained trade through its preferential deals with railroads, its control of pipelines and by engaging in unfair practices like price-cutting to drive smaller competitors out of business.

This gave the powers at be enough momentum to keep Standard Oil tied up in legal battles and to get the Supreme Court’s attention. On “May 15, 1911, the Supreme Court ordered the dissolution of Standard Oil Company, ruling it was in violation of the Sherman Antitrust Act.” That is where Standard

Oil was eventually headed, but before this dissolution and all of the legal hoopla, Rockefeller was enjoying himself as the prominent oil mogul he was.

## From Height of Power to Fall from Grace

Rockefeller soon became a force to be reckoned with. Flynn states that "what was known as the Standard Oil consisted of forty corporations. Mr. Rockefeller and his associates owned fourteen of these completely and controlled a majority of the stock in twenty six others. In 1870 he had incorporated his company with a million dollars' capital. Now the capital was seventy million" Also, as Chernow states, in 1879, when Rockefeller was just forty years old, he was considered to be in the top twenty richest men in America. He would also make the decision to move Standard Oil headquarters to New York. The new headquarters would be stationed off Broadway. In what would be a massive standardization of services, Rockefeller would form a large committee of experts "dedicated to transportation, pipelines, domestic trade, export trade, manufacturing, purchasing, and so on." Because of this committee dynamic that Rockefeller encouraged, there were ample opportunities for inter-committee competition between each of the specialized committees, and "it was an ingenious adaptation, integrating the policy of constituent companies without stripping them of all autonomy." Rockefeller understood that this dynamic was best served when competition was encouraged among the members of the committee, instead of stifled by a short leash. He understood that the best quality work came from competition, but it was a competition that was from within the confines of his carefully controlled empire, nonetheless.

After establishing his business as much as he did at this point, he stopped working as much (still a considerable amount though) and even went on a family vacation to Europe, leaving the states for the first time at the age of forty. He wasn't able to relax for too long before he started inquiring home about the state of his business. It also didn't help that everywhere he went people were starting to recognize him. It "must have been startling to

realize that his fame and notoriety were now so widespread in a world dominated by Standard Oil that he could no longer find refuge anywhere from his own reputation." It was among the popular belief that although Rockefeller was seen as a shady character by most; at least they "preferred his kerosene." Although he was a ruthless businessman who would continue to crush whoever he saw fit for the longevity of his empire, at least he understood the importance of quality products rendered. He also understood the importance of cutting out the middleman, and by 1875 he had cut some of the fat out of the sales process. Normally, as Flynn states in God's Gold, "The established method of marketing kerosene was from the refiner to the wholesaler, from the wholesaler to the retailer—mostly grocers—and then to the consumer." Rockefeller thought it necessary to actually wholesale his own oil to the retailer himself. Although a very logical move to increase efficiency and profit, he would receive criticism for taking away the jobs of people and further extending his stranglehold on the industry. Because he started setting up his own wholesaling branches, "within a few years he was in almost complete possession of the marketing machine." But this dynamic did not make the public happy at all, but "it became also the most violent irritant on public opinion and resulted in more angry denunciation of the monopolist than anything else he did."

It was at this point that he also started giving more of his money to charity. Some saw his charity as a means of atonement for his entrepreneurial sins. Others could look past the lavish giving and erection of buildings with the Rockefeller name as a legitimate token of philanthropy—it came from a good place. In reality, Rockefeller was a religious man who had always given ten percent of his earnings in one way or another to the church or organizations that needed it. If he was compelled to give 35 million for the formation of the University of Chicago, he would do it. Interestingly enough, he did not believe in advertising his giving. Instead knowing that he had an obligation to God and no one else, "Rockefeller insisted that his name not be used anywhere on campus, even rejecting an image of a lamp on the university seal, lest it be taken as a suggestion of the influence of Standard Oil." He did not stop with the university either, and "In 1901, he funded the Rockefeller Medical Research Institute in New York City… Within a decade, it created a vaccine for cerebrospinal meningitis and had

supported the work of America's first winner of a Nobel Prize in medicine." That was all in a day's work for Rockefeller. As his wealth ballooned, so did the amount that ten percent of his charity amounted to. It did not mean that he was feeling guilt for the methods he had used to procure his massive fortune, but that he stuck to his principles so strongly. All in all, Rockefeller gave a huge portion of his money away for religious reasons.

## (Part 3)

## Rockefeller's Children, Later Years, and Legacy

Rockefeller had five children (four daughters and one son.) Because of the very religious principles he upheld, they too would experience the restrictive effects of those principles. While they were young, he homeschooled them, gave them extremely small allowances to teach them the importance of frugality and discipline, and sheltered them as best he could from the temptations of the world. Chernow says that Rockefeller very rarely discussed money with his children, and as a result, they were none the wiser to learn just how massive his fortune was. His wife, "Cettie" Rockefeller was extremely strict, and John Junior "had to put up with unremitting religious indoctrination from Cettie." Chernow says that when compared, John Sr. was extremely lighthearted and playful. The amount of pressure on John Junior would prove to be immense and he would suffer nervous breakdowns on account of the stress he faced while trying to please both of his strict parents. He suffered one shortly after he finished a particularly stressful school period when he was thirteen years old. The solution for his malady was that he was forced to chop wood for a winter, as a way of "working the nervous tension from his system." Perhaps this was not the most ethical way of keeping his son in tip-top psychological shape, but it seemed to work for John Jr. because he returned to school after the winter refreshed and ready—it was most likely a result of having spent the whole winter with his strict mother that the freedom that the school offered gave him considerable vitality. His children, despite the questionable

methods of John and Cettie, were healthy and productive. John Jr. would go on to become a successful financier, and the rest find love, marry, have children, and go onto to make contributions in genetics for more profitable farm animals (Edith Rockefeller) as well as help form the first Woman's World Fair (also Edith).

Eventually, Rockefeller retired at the age of 56. It was 1895, and he would spend the rest of his life focused on giving a good portion of his estate to charity. He would die at the age of 97, in the year 1937. Before that, "as if he were live his life backward, Rockefeller belatedly entered adolescence in his ninth and tenth decades." It took a long time, but John seemed to warm up to the idea that he could enjoy himself in his old age and success. Showing a youthful exuberance in life, "he became something of a clotheshorse with an extensive wardrobe of dandyish costumes." In an uncharacteristic show of extravagance, he enjoyed the more materialistic side of life. He also began playing around with the stock market later on in life, making very calculated gambles, and borrowing money from Junior who had made a name for himself in finances as well. Despite the brief period of fun and relaxation in his later years, he would still be forever known as a bulldog and exacting businessman, full of cunning and faith, steeped in principles and Christian ethics, and humorless over everything.

His legacy lives on in the form of the ExxonMobil, Chevron, and BP, who are all affiliates of the Standard Oil name. He is still considered to be one of the most influential figures in how American business was shaped, for better or worse. Despite how complicated or manipulative many consider John D. Rockefeller to have been, we need to understand that to be one of the richest people in the world requires a mentality that is not bogged down with overthinking or option paralysis. Rockefeller may have made questionable decisions and manipulated the system to profit immensely from oil, but someone had to do it for safeguards to be made. It isn't until someone makes something possible that it becomes a standard process, and with Standard Oil, Rockefeller helped shape how the world would respond to corporations, monopolies, trusts, and the whole gambit of the industry.

# Thomas Edison: A Biography

Thomas Edison was one of the most prolific inventors in American history. His invention of the light bulb allowed electricity to be utilized safely for personal and commercial lighting purposes throughout the world, and he revolutionized the use of industrial research laboratories. Edison's inventions led to profound innovations such as video cameras, motion pictures, and telecommunication systems. Despite receiving a very limited formal education, Edison was able to successfully help foster in a new era of technology in the United States. He was known for running several successful businesses and was highly regarded throughout his life as a both an inventor and maverick.

## Early Life

Thomas Alva Edison was born on February 11, 1847 in Milan, Ohio. Edison's ancestors arrived in Colonial America from Holland in 1730 and settled in Caldwell, New Jersey. Edison's grandfather was a fervent Loyalist and fled the United States and relocated to Ontario, Canada after serving in the War of 1812. Edison's father, Samuel Edison, made shingles from Canadian timber, and Edison's mother, Nancy Matthews Elliot, was a well-educated homemaker and school teacher. Edison's father relocated to Milan, Ohio following the failed Mackenzie Rebellion of 1837.

When Edison was growing up in Milan, the small town was connected to other cities in Ohio through a canal system. Edison only attended school for several months, and instead, received his education at home. His mother home schooled Edison, and he read R.G. Cooper's School of Natural Philosophy and The Cooper Union for Advancement of Science and Art. His mother was very intelligent and helped encourage Edison's curiosity.

Edison suffered from a serious case of scarlet fever when he was young and had multiple, untreated middle ear infections. He suffered from diminished and impaired hearing throughout his life and attributed his hearing loss to being thrown off a moving train by its conductor when he was twelve.

During his childhood, the owners of Milan's canal system fought vigorously to prevent the development of a railroad. The railroad would have bankrupted the canal owner's business. The canals in Milan reached Lake Erie, which gave the town access to the Atlantic Ocean and was a major trading port in the Midwest. The canal owners succeeded in keeping the railroad companies from expanding tracks through Milan, but it cost the town significant business. The economy began declining, and Edison's family moved to Port Huron, Michigan when Edison was seven in the hopes of finding a better financial situation.

When the family relocated to Port Huron, Edison sold candy and vegetables on trains that ran from Port Huron to Detroit. During his childhood, Edison suffered from a variety of health issues. He was, by all means, a sickly child.

Edison's mother was constantly worried about Edison's health. Edison's mother already experienced the grief of losing three children. Two died during infancy, and the third died before Edison turned one year old.

His mother used to be a school teacher, and she took control of Edison's education. She assigned and developed an extensive reading program for her youngest son, who loved to read. Edison was especially interested in what was happening outside of Port Huron. Edison's favorite subject to read and learn about was science.

He constantly read books, newspaper articles, and magazines that featured topics in science. He was also very interested in trains, which was why he took a job selling newspapers and candy on the local trains when he was twelve years old. Edison regularly read the novels and newspapers he sold to passengers.

While working on the trains, Edison began experiencing hearing loss. Hearing loss, even in young people, was fairly common during his life. Since antibiotics like penicillin were not available, many conditions like ear infections were left untreated. Edison believed that his hearing loss was actually a benefit, because it helped him focus more astutely on his work and fall asleep without distraction.

Edison opened and ran two newspaper stands in Port Huron and even hired two other boys to help run the stand. He sold magazines and newspapers, and for six months in 1862 printed and published his own newspaper called The Weekly Herald. Edison's newspaper featured local news and railroad-related content and was very popular. Edison printed the newspaper in a baggage car of one of Grand Trunk's Michigan trains. One of the fleet's conductors helped Edison print the newspaper.

Edison used the profits from his venture to help fund his first laboratory in a baggage car. During an experiment involving phosphorous, Edison started a fire. At the next stop, the conductor threw Edison, his laboratory, and his printing press off the train. However, Edison wasn't fired from his job with the railroad.

When Edison was sixteen, he saved a young boy's life when the child wandered on to the railroad tracks in front of an oncoming train. The boy's father offered to teach Edison about railroad telegraphy and offered him a high paying job as a telegraph operator.

## Early Adulthood

Edison spent the next several years traveling throughout the midwest United States working as a telegraph operator. He worked as an itinerant telegrapher and filled in for workers who left to serve in the Civil War. Edison spent most of his free time reading and experimenting with telegraphy technology.

Edison began having difficulty finding work as a telegraph operator. Innovations in the field of telegraphy led to the transmission of Morse code through ear pieces, meaning receivers were expected to transcribe messages they heard. Previously, Morse code was written on paper. Since Edison suffered from deafness, he found it difficult to succeed in the field.

In 1868, Edison decided to return home to Port Huron. When he arrived, he was shocked to find his family was destitute. His beloved mother was suffering from severe mental health issues and his father was unemployed.

One of Edison's friends suggested he work for Western Union Company in Boston.

In 1869, Edison applied for, and received, his first patent for an electrical voting machine. He designed it for the Massachusetts legislature to help speed up elections and make it easier and quicker to count votes. However, the politicians weren't interested in his idea, and Edison learned that it was unwise to invent something that no one wanted.

Shortly after, Edison moved to New York City. In 1869, when Edison was twenty-two, he invented and patented an improved stock ticker. The invention was called the Universal Stock Printer and was able to synchronize multiple stock ticker transactions. His invention sold for $40,000 to The Gold and Stock Telegraph Company. Edison promptly quit his job as a telegraph operator and begin to devote his time to new inventions.

## Edison's Inventions

In 1870, Edison opened a laboratory in Newark, New Jersey, and hired several machinists. The facility featured a small manufacturing facility. Most of Edison's early inventions involved telegraphy innovations and improvements and he routinely auctioned his inventions to the highest bidder.

Edison sold many of his inventions to Western Union Telegraph Company. Edison invented the quadraplex telegraph, which allowed two signals to be sent in two different directions simultaneously. The invention was originally intended for Western Union Telegraph Company, but railroad tycoon Jay Gould bought the invention for $100,000.00 in cash, stocks, and bonds. The sale resulted in years of litigation between Gould and Western Union.

Edison moved to Menlo Park, New Jersey in 1876 and opened a newer and larger laboratory and manufacturing facility. Edison invented the phonograph in 1878, which was the first device created that could record sound. The invention brought him worldwide fame and earned him the

nickname “The Wizard of Menlo Park.” The invention was so unexpected that the public thought the concept of recording sound was almost magical.

Although the phonograph’s recording quality was originally limited and could only play a recording a handful of times, Edison was asked to demonstrate the invention before the National Academy of Science in 1878. Multiple Congressmen, Senators, and even President Rutherford B. Hayes witnessed the demonstration. Edison was called the greatest inventor in the world by Joseph Henry, the President of the National Academy of Sciences. Edison became the most famous inventor in the United States and attained worldwide fame.

Edison’s Menlo Park facility was the first of its kind. It featured a laboratory, office, manufacturing facility, library, and machine shop. He hired a staff of machinists and physicists who worked as a team to make Edison’s ideas a reality.

Edison began working on inventing a more efficient incandescent light bulb. He decided to purchase patents belonging to Henry Woodward and Matthew Evans, who held patents for arc lighting bulbs and tubes.

Arc lighting was already invented when Edison began working on creating a light bulb. Arc lighting, despite its effectiveness, was extremely bright, which discouraged people from wanting electric lighting in their homes. Arc lighting was mostly limited to commercial settings.

Edison worked to create an electricity powered lighting system to compete with oil and gas lamps and lighting that could be used safely indoors. Edison worked to create a long lasting incandescent lamp and fixing common issues faced by other inventors, which included an excessive production cost, very short life spans, and high electrical current draws. He realized that in order for him to be successful in his endeavor, he needed to create a lamp that used a low amount of current, had high resistance, and used low voltage.

He experimented with several different designs, using carbon, platinum, and other metal filaments. Edison decided to use a carbon filament in his final design and completed his first successful test on October 22, 1879. The light bulb lasted for thirteen and a half hours. Edison spent more time

perfecting the design before filing for U.S. patent 223,898 for an electricity powered lamp that used a carbon filament or strip coil that connected to platina contact wires. The patent was officially approved on January 27, 1880. Edison's invention was the first commercially successful and practical incandescent light bulb.

Edison formed the Edison Electric Light Company in 1878 with the financial backing of J.P. Morgan, Spencer Trask, and several members of the prominent Vanderbilt railroad tycoon family. The company was headquartered in New York City. On December 31, 1879, Edison performed the first public demonstration of his light bulb in Menlo Park, New Jersey. Henry Ford later recreated the event to honor Edison.

One of the members of the audience was Henry Villard, who was the President of the Oregon Railroad and Navigation Company. Villard asked Edison to install his light bulbs and electrical lighting system on the company's brand new luxury steamship, the Columbia. Edison was at first reluctant, but he eventually agreed to install the system on the Columbia. When the work was completed in May 1880, the Columbia became the first commercial application of Edison's light bulb.

After his success with the light bulb, Edison began focusing on distributing electricity. In 1880, he founded the Edison Illuminating Company, and shortly after received a patent for a new electrical distribution system. In 1882, his company opened the first investor owned utility station on Pearl Street Station in New York. On September 2, 1882, Edison's Pearl Street electrical power distribution center was turned on and provided 110 volts direct current electricity to 59 customers in Manhattan. Earlier that year, Edison opened his steam powered generation station at Holborn Viaduct in London, which provided direct current electricity that powered street lamps and several private homes.

Edison's company provided direct competition to companies that provided gas for gas powered lights.

Beginning in the early 1880s, Edison faced direct competition from promoters of alternating current electricity. More companies were starting

to use electricity and arc lighting. Proponents of alternate current electricity argued that it was safer, cheaper, and more efficient.

Nikola Tesla was working relentlessly to create a viable means to use alternate current electricity throughout the 1870s with the financial backing of George Westinghouse. George Westinghouse began providing transformers in Europe and the United States that made it possible to transmit alternating current electricity over long distances. AC electricity used cheaper and thinner wires and resulted in decreased voltage outputs, making it safer for commercial and residential applications. AC was able to be used to power street lights and domestic customers, which threatened Edison's incandescent lamp system. Edison was now facing direct competition from supporters and providers of AC electricity.

The main problem Edison face was that he could only deliver DC electricity to customers within one mile of his power plant and his application was only viable in large, densely populated cities. Edison's system left many customers without access to DC service. Customers in smaller towns and rural areas had no access to electricity from any of Edison's plants, and Edison's electricity delivery system was far too costly for small areas. Edison argued that AC was unsafe because it relied on high voltage, and publicly stated that Westinghouse's installation of his AC delivery system would kill customers.

Edison had already installed more than 100 low voltage DC powered systems, and the company couldn't afford to transition to an AC delivery system. The AC system also threatened to cut significantly in to Edison's profits.

By 1887, Edison had a total of 121 DC based power stations. Westinghouse installed 68 AC power stations, and Thomas-Houston Electric Company installed twenty-two power stations. Edison Electric was losing its market share rapidly.

Edison engaged in ethically questionable tactics in an attempt to stall the widespread adoption of AC. Edison took advantage of massive public fear following a series of deaths related to pole mounted AC lines. He partnered with Harold Brown, an infamous anti-AC activist in New York, to create a

massive propaganda campaign in an attempt to discredit AC. The two worked together to create public demonstrations that showed the dangers of AC. One such demonstration involved the execution of animals with AC electricity. Edison staunchly supported anti-AC regulations and laws and advocated for the government to pass extensive regulation and restrictions on AC electricity systems.

The extreme competition between AC and DC, publicly fought by Edison and Westinghouse, was so intense that it is known as the War of Currents. A public scandal involving AC, DC, Edison, Westinghouse, and the electric chair soon took place.

Although execution by means of electrocution was legal, the State of New York never defined what type of electrical current or how much voltage was to be supplied during an electrocution.

In 1888, the state of New York commissioned the New York Medico-Legal Society to investigate the type of electricity, the type of current, and the amount of current that should be used during an execution. Brown was hired as a consultant. Brown used the investigation to try to prove, conclusively, that AC was more dangerous than DC. Brown and Edison wanted the electric chair to be supplied by Westinghouse's AC current, believing that it would disturb the public, prove that AC is deadly, and result in the widespread adoption of DC.

Brown arranged testing at Edison's West Orange laboratory, so the Medico-Legal Society could observe experiments to figure out what amount of electricity and what type of current should be used for executions. On December 5, 1888, Brown set up several experiments for Medico-Legal Society, the chairman of the death penalty commission, and members of the press.

The experiments all used AC and involved electrocuting animals to death using AC electricity. Animals larger than humans, including calves and a horse, died after being struck with 750 volts of AC electricity. Brown ensured that members of the press published that AC lines carried 1,000-1,5000 volts in an attempt to make the public fearful of AC.

Brown declined to provide an electric chair prototype but agreed to supply the electrical equipment needed for execution. Brown contacted Edison Electric and Thomas-Houston in order to get assistance in acquiring three Westinghouse AC generators. Brown's goal was to ensure that the electrocution and electric chair were powered by AC.

In May 1889, the State of New York sentenced William Kemmler, then known as the "Axe Murderer," to death by execution. Westinghouse paid famous attorney William Bourke Cockran to appeal Kemmler's sentence in an attempt to prevent AC electricity from being used during Kemmler's execution.

The appeal was fought on the basis that death by electrocution was cruel and unusual because the AC voltage suggested for the execution would not result in Kemmler's death. Westinghouse employed Cockran to win the appeal by advocating the safety of AC. The appeal was denied, and the Supreme Court of the United States refused to hear the case.

Kemmler was executed on August 6, 1890, becoming the first person executed via the electric chair. The chair was supplied by AC current. The executioner misjudged the amount of voltage needed to kill Kemmler, and after the initial seventeen seconds of electrocution, Kemmler was still breathing. Kemmler died after the voltage was increased.

The scandal involving Brown, Edison, and Thomas-Houston was exposed on August 25, 1889 in the New York Sun, after they received forty-five letters that were stolen from Brown. The letters discussed how Brown worked with Thomas-Houston to acquire Westinghouse generators, and that Edison Electric paid Brown $5,000.00 to obtain the generators from Thomas-Houston.

Edison's involvement and public attempt to destroy Westinghouse and AC power led to him losing majority control of Edison Electric in 1892. Edison Electric was faced with declining profits due to the success of AC. J.P. Morgan oversaw a merger between Edison Electric and Thomas-Houston in 1892. Thomas-Houston's board was put in charge of the new company, called General Electric. After the merger was complete, General Electric

controlled 75% of the electrical business in the United States, and slowly transitioned to adopting AC.

## Later Career

Edison's first wife, Mary Stillwell, died in 1884. They married on December 25, 1871 when Mary was sixteen years old. She was one of Edison's employees, and the couple had three children. Her cause of death was unknown but may have been the result of a brain tumor or a morphine overdose. After her death, Edison moved to West Orange, New Jersey.

He purchased a home and laboratory in Llewellyn Park in 1886 as a wedding gift for his new wife, Mina Miller. Mina was originally from Akron, Ohio, and was twenty years old when she married Edison. Her father, Lewis Miller, was an inventor and co-founder of Chautauqua Institution, and Mina was the benefactor of Methodist charities. The couple had three children.

Edison also purchased a home in Fort Myers, Florida in 1885 where he spent most of his winters.

He spent most of his free time at the West Orange laboratory experimenting with motion picture technology and researching rubber, batteries, and cement. Edison focused the majority of his efforts managing and supervising his businesses.

In 1888, Edison successfully invented the motion picture camera, which he called the "Kinetograph." While Edison oversaw the mechanic design of the invention, his employee, W.K.L. Dickson, who was a trained photographer, was tasked with working on the photographic and optical features. In 1891, Edison perfected a peep hole viewer, named the Kinetoscope, which were installed in a number of penny arcades where patrons could pay to watch short films. He publicly demonstrated his kinetograph and kinetoscope on May 20, 1891.

The kinetograph and kinetoscope were widely successful throughout Europe. In 1894, Irving Bush, a very wealthy American business man,

bought twelve kinetoscopes from the Continental Commerce Company. Bush installed the first machine in Europe on October 17, 1894 in London. Hundreds of kinetoscopes sold throughout Europe in 1894 and eventually spread throughout Belgium and Brussels.

Edison opened a film studio which produced over 1,200 short films for his kinetoscopes. In order to prevent other studios and companies from stealing his films, Edison filed for copyrights and submitted prints of his films to the United States copyright office. He then founded the Motion Picture Patent Company which was a group of the nine largest film studios. Edison's favorite film was The Birth of a Nation, which was a silent movie. His favorite actresses were Mary Pickford and Clara Bow. He said later in life, the invention of talkies, which were movies that included sound, ruined film.

Edison's company manufactured and marketed the Vitascope in 1896, which was invented by Thomas Armat. The Vitascope was a projector and was used to screen motion pictures in New York City. Edison also used cylinder recordings to create voice soundtracks that synchronized with motion pictures. Edison became the first person to project a motion picture on April 23, 1896 when he hosted a screening at New York's Koster and Bial's Music Hall.

Edison briefly pursued a mining venture and formed the Edison Ore Milling Company in 1881. High-grade iron ore was scare in the eastern United States in the 1870s, and Edison attempted to focus on mining low-grade ore. He invented a mining process that could pulverize up to ten tons of rock that used rollers and crushers.

Edison also focused on iron mines in northwestern New Jersey throughout the 1890s. The increase in steel production in the United States led to a high demand for iron. Edison sought to find a way to extract usable iron core from heavily depleted mines. He tried to develop a process of crushing rocks and sending the debris past a magnet to extract the usable iron. The machines used in the process were unreliable and prone to mechanical failures. The iron that was extracted was of very low quality and extremely difficult to work with. Toward the end of the 1890s, iron prices plummeted. Edison exited the venture after investing millions of dollars.

He was able to salvage some of his losses by redesigning the equipment and machines for cement production. The machines were used for Portland cement, which was a new building material that was gaining extensive popularity in the United States. Most of the cement used to build Yankee Stadium was Edison Portland cement.

In 1901, Edison traveled to Ontario, Canada. He attended an industrial exhibit in Sudbury and believed that he would be able to utilize cobalt and nickel to produce electrical equipment. He briefly became a mining prospector, although the inquiry started and ended in 1903. Edison successfully discovered the Falconbridge ore body before his prospecting attempts failed. The head office of Falconbridge Mines is named after Edison, as is a street in Falconbridge, honoring his discovery.

Edison successfully produced a nickel iron battery in 1910 with one of his smaller companies, Edison Storage and Battery. The company was founded in 1901 as a means to apply one of his inventions, the accumulator. The accumulators were manufactured for electric cars, but they were rife with defects and many customers voiced complaints. Edison believed that electric cars were better than gasoline-powered ones, and once claimed that his batteries would be able to power a car for 100 miles before needing recharged. Despite having over 450 employees in 1904, the company spent through all of its cash reserves. Edison funded the company with his person money. When he completed a working storage battery, gasoline powered engines for cars were the market leader, but Edison's storage battery was used for many other applications, including for railroad signals. It also was one of Edison's most profitable inventions.

Edison also invented the self-starter for Model-T car's, which was an innovation that was used in the car industry for decades.

In 1915, following the outbreak of World War I, Josephus Daniels, the Secretary of the Navy, asked Edison to head the Naval Consulting Board. The board was created to oversee the submission of patents and ideas that had military applications because the United States was preparing to enter the war.

Edison, who had an aversion to violence, refused to invent anything that was meant to injure or kill people. Although Edison and the board reviewed over 100,000 patents and inventions throughout World War I, only one was ever developed.

In 1927, Edison created the Edison Botanic Research Corp., which was a partnership he formed with Henry Ford and Harvey Firestone to create a plant that could supply rubber. Ford, Firestone, and Edison were concerned that the United States relied too heavily on foreign trade partners for their supply of rubber. Edison opened a laboratory in Fort Myers, Florida in 1928 to research and grow plants that could produce rubber. He analyzed over 17,000 plant samples, sending some back to his lab in West Orange, New Jersey. He used a two-part acid base extraction technique in order to derive latex from plant materials after the plant was dried and crushed in to a powder. He found that the Goldenrod plant would be an adequate source for rubber production.

Edison received the Congressional Gold Medal in 1928 for illuminating "the path of progress by his inventions." He spent most of his later years at his Fort Myers residence with his wife. He joined the Civitan Club in Fort Myers in 1928, which was an association of local service groups that was dedicated to improving the lives of others. He remained active in the organization until his death.

Edison died on October 18, 1931 from complications from diabetes. He died in his home, nicknamed Glenmont, in West Orange, New Jersey. Edison was buried behind his home. Rev. Stephen J. Herben officiated Edison's funeral.

## Personal Life

Edison had six children between two wives. His second wife, Mina, died in 1947. His fifth child, Charles Edison, was governor of New Jersey from 1941 until 1944. Charles eventually took over Edison's companies after his death. Charles served as the Assistant Secretary of the Navy for several

months in 1940 but resigned on June 24, 1940 in order to run for governor of New Jersey. He ran Edison Records for several years before running the Thomas A. Edison Company after his father's death. He oversaw the company's merger with McGraw Electric Company in 1957.

Thomas Edison Jr., Edison's youngest son, attempted to follow his father's footsteps as an inventor. However, Edison Jr. was involved in several public scandals. He opened and founded the Thomas A. Edison Jr. Company and regularly sold products that made outlandish, unproven claims. Several of his products offered cures for a variety of medical conditions but were inoperable.

In the early 1900s, Edison Jr.'s company marketed and sold a device called the Vitalizer. In 1903, he ran ads claiming that the device, which consisted of two copper plates that could be applied to the head or body, harnessed the power of electricity to stimulate the body's nerves and natural healing abilities. He submitted his patent for the device twice to the United States patent office, and both times it was rejected because it was nonfunctional. Edison Jr. continued to sell the product and was charged with postal fraud in 1904.

Edison Jr. sold his famous last name to a long list of shady, unethical, and unsavory businesses.

Edison employed questionable parenting tactics with his children. He required all of his children to complete daily tasks typically involving reading extensive excerpts from encyclopedias and books. He would give his daughter, Madeline, surprise quizzes in the morning during breakfast. If she gave the wrong answer or took too long to answer his questions, Edison burned the back of her hand with a hot metal spoon.

Edison Jr. and Edison spent much of their life at odds. Edison Jr. dropped out of an elite preparatory school at seventeen before receiving his diploma and moved to New York. Edison Jr. was then the subject of an extensive newspaper article that was widely read. He made several outlandish claims in the article that weren't fact checked, including that he invented a better light bulb than his father. He also was interviewed by several journalists at

an electrical exhibit at Madison Square Garden where he claimed to be on the cusp of completing a major invention.

Edison Jr. used his fame to convince investors to back untested products and ventures. In 1901, he sold “Wizard Ink,” tablets, claiming they dissolved in an ounce of water without leaving any residue. He took out ads claiming that products like Wizard Ink and the Vitalizer were scientifically tested. Edison was the one who persuaded the United States Postal Service to intervene with Edison Jr.’s Vitalizer product, and he agreed to pay Edison Jr. $35 per week if he would change his last name. His son changed his name to Thomas Willard. Edison sent his son to a mushroom farm in the hopes that it would motivate and inspire his son to succeed and agreed to raise his sons allowance to $50 per week. Unfortunately, Edison Jr. devolved in to a state of hopeless alcoholism and ended up in a sanitarium. Edison left his son a seat on his company’s board of directors, but Edison Jr. died shortly after his father in 1935.

Marion Edison, Edison’s first child, had a strained relationship with her father. She had difficulty adjusting when Edison remarried, due to her step mother’s young age. Marion was closer in age to Mina than Edison. Marion spent the majority of her teenage years in Europe, and when she contracted a serious case of smallpox, her father only wrote her twice in seven weeks.

William Edison served in World War I after graduating from Yale. He worked as an automobile mechanic and later became a chicken father. William never got along with his father.

Madeleine had the highest aptitude of all of Edison’s children, especially in engineering and science. She unsuccessfully ran for Congress in 1938 and served on the Board of Directors for the Western Union Company.

Edison’s youngest son, Theodore, graduated from MIT in 1923 with a physics degree. He worked as a laboratory assistant for his father at Thomas A. Edison Inc., and worked his way up to director of research and engineering. He eventually opened his own company, Calibron Industries, near West Orange, New Jersey and was awarded eighty patents throughout his lifetime.

Edison was close friends with Henry Ford and was known for his poor social skills. He often neglected his family obligations and focused on his work. He was awarded 1,093 patents during his life. He was known as being a ruthless competitor and a tyrant to his employees. He was also egotistical and rarely admitted when he was wrong. His widow, Mina, died in 1947. Edison was highly respected throughout his life and was known as the greatest inventor in American history. He loved animals and was a vegetarian, and routinely denounced violence.